Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

Inv. G. M. Darrow

U. S. HORTICULTURAL STATION
RECEIVED
☆ MAR 27 1941 ☆
LIBRARY
BELTSVILLE, MARYLAND

THE PLANT DISEASE REPORTER

Issued By

The Office of Mycology and Disease Survey

Supplement 45

Diseases of Vegetable and Field Crops in the United States in 1925

May 1, 1926

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF FIELD AND VEGETABLE CROPS IN THE UNITED STATES IN 1925

Prepared by

R. A. Jehle, Collaborator, Plant Disease Survey and Plant Pathologist, Maryland Agricultural Experiment Station; and Jessie I Wood, Junior Pathologist, Office of Plant Disease Survey and Pathological Collections, Bureau of Plant Industry.

Plant Disease Reporter
Supplement 45

May 1, 1926

CONTENTS

Weather Data I
Introduction 2
Outstanding Observations 2
Diseases of Potato 2
Diseases of Tomato 29
Diseases of Sweet Potato 49
Diseases of Bean 58
Diseases of Lima Bean 65
Diseases of Onion 66
Diseases of Crucifers 73
  Cabbage 73
  Cauliflower 79
  Brussels Sprouts 80
  Charlock 80
  Chinese Cabbage 80
  Collards 81
  Horseradish 81
  Kale 81
  Kohlrabi 82
  Mustard 82
  Radish 82
  Rutabaga 82
  Turnip 83
Diseases of Cucurbits 84
  Muskmelon 84
  Cucumber 87
  Pumpkin 92
  Squash and Summer Squash 92
  Watermelon 93
Diseases of Celery 96
Diseases of Lettuce 99
Diseases of Pea 103
Diseases of Cotton 108
Diseases of Tobacco 117
Diseases of Sugar Cane 129
Diseases of Sugar Beet 137
Diseases of Other Crops 142
  Artichoke (Jerusalem) 142
  Asparagus 142
  Beet (Garden) 142
  Carrot 143
  Cassava 143
  Eggplant 144
  Endive 145
  Gandule (Pigeon Pea) 145
  Ginseng 145
  Hop 145
  Mangel 146
  Okra 146
  Parsley 147
  Parsnip 147
  Peanut 147
  Pepper 147
  Rhubarb 149
  Roselle 150
  Salsify 150
  Schaff (Rumex acetosa) 150
  Sisal 150
  Spinach 150
  Spinach (New Zealand) 152
  Swiss Chard 152
  Yam 152

Table A. Departure from the normal temperature and rainfall by states - April to September.
(Figures taken from United States Department of Agriculture Monthly Weather Review 53: 1925.)

1925

State	Departure from normal											
	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
New Eng.	+1.9	-2.4	+3.0	-1.0	+0.1	-0.1	-1.08	-0.93	+0.71	+0.83	-1.72	+0.35
N. Y.	+2.0	-4.1	+3.3	-2.0	+0.3	+0.6	-0.29	-0.81	+0.59	+0.89	-1.29	+1.49
N. J.	+2.1	-2.6	+5.1	-1.5	-0.9	+2.1	-1.22	-0.93	-0.64	+2.78	-2.71	-0.71
Pa.	+2.5	-4.9	+4.1	-1.8	-0.7	+3.9	-1.02	-0.30	-1.19	+1.55	-2.24	-0.59
Del.-Md.	+2.7	-3.9	+4.8	-0.5	-1.6	+4.2	-0.77	-1.70	-1.69	+0.68	-1.84	-1.53
Va.	+2.7	-4.6	+4.2	+0.7	-1.6	+5.3	-0.73	-1.78	-1.79	-1.53	-2.12	-1.58
N. C.	+3.5	-2.9	+3.1	+2.1	-0.3	+6.2	-1.34	-1.27	-0.99	-3.18	-2.63	-1.96
S. C.	+3.7	-2.7	+2.8	+1.7	+1.3	+7.3	-0.92	-1.46	-1.71	-2.70	-4.40	-2.14
Ga.	+4.1	-1.7	+2.5	+2.1	+1.1	+8.6	-1.84	-1.59	-1.75	-2.28	-3.73	-2.10
Fla.	+0.4	-1.6	+0.2	+0.3	+0.1	+3.6	-1.25	+1.69	-0.38	+0.18	+0.03	-4.30
Ala.	+4.8	-1.3	+2.9	+1.6	+1.1	+8.2	-2.94	-1.79	-2.06	-0.83	-3.17	-0.85
Miss.	+5.2	-1.0	+2.0	+1.6	+0.6	+7.5	-4.26	-1.43	-1.78	-0.51	-2.02	-0.24
La.	+3.9	-1.4	+1.5	+1.4	+0.4	+4.2	-3.72	-1.73	-0.68	-0.98	-1.98	+1.69
Texas	+5.4	+0.6	+3.3	+2.7	0.0	+2.0	-1.19	-1.01	-1.86	-0.69	-0.38	+1.53
Tenn.	+5.2	-3.1	+4.1	+1.8	+1.0	+8.9	-1.15	-2.20	-1.54	-1.21	-2.63	-0.52
Ky.	+5.3	-4.4	+3.1	-0.2	+0.8	+7.0	-0.86	-1.39	-0.19	-0.29	-2.24	+0.03
W. Va.	+3.4	-4.8	+3.1	-0.9	-0.9	+5.0	-0.80	-0.84	-0.51	+0.21	-2.14	-0.73
Ohio	+4.2	-5.2	+3.6	-1.7	+0.3	+4.6	-1.23	-1.11	-0.98	+0.89	-1.12	+0.90
Ind.	+5.6	-4.1	+3.2	-0.9	+0.3	+6.2	-1.21	-2.80	-0.03	+0.82	-0.76	+2.22
Ill.	+6.8	-3.4	+3.2	-0.1	+0.5	+6.2	-0.75	-2.85	+1.19	-0.48	-0.78	+1.46

State	Departure from normal											
	Temperature (°F)						Precipitation (inches)					
	April	May	June	July	August	September	April	May	June	July	August	September
Mich.	+5.0	-2.9	+2.9	-1.4	+2.0	+2.4	-0.47	-2.26	-0.67	+0.33	-0.51	+0.67
Wis.	+5.6	-2.9	+1.3	-1.1	+1.7	+3.4	-0.41	-2.70	+2.12	+0.57	-1.04	+1.18
Minn.	+6.5	-1.7	-1.0	-1.9	+2.8	+2.9	+0.02	-1.74	+2.82	-0.43	-1.11	+1.38
Iowa	+7.6	-2.4	+1.1	+0.3	+0.7	+4.7	-0.79	-3.45	+2.11	-1.19	+0.03	+1.59
Mo.	+5.9	-3.4	+3.0	+0.5	+0.5	+5.6	+0.38	-2.56	+1.43	-1.34	-0.23	+2.73
Ark.	+6.2	-1.2	+5.5	+1.9	+0.9	+6.6	-2.16	-3.24	-2.00	+1.07	-2.02	+2.63
N. Dak.	+6.1	+1.0	-1.3	-0.8	+2.5	+1.7	+0.26	-1.11	+2.57	-1.27	-1.21	+1.10
S. Dak.	+7.6	+0.6	-0.7	-0.4	+3.3	+4.3	-0.44	-1.45	+2.22	-0.99	-1.01	-0.67
Nebr.	+6.2	-0.3	+1.6	+0.9	+0.2	+3.7	-0.06	-1.49	+0.66	-1.24	+0.55	-0.32
Kans.	+6.2	-0.2	+4.5	+0.8	+0.1	+3.3	+0.92	-1.63	+0.05	-0.20	+0.35	+1.30
Okla.	+6.6	+0.3	+6.2	+2.8	0.0	+2.6	+1.12	-2.24	-1.94	+1.13	-1.66	+3.25
Mont.	+4.5	+2.9	+0.4	+2.3	-0.2	-0.3	+0.81	-0.86	+0.23	-0.38	-0.27	+0.87
Wyo.	+4.4	+3.1	-1.0	+1.4	-0.9	+0.7	+0.14	-0.20	+0.87	+0.16	+0.32	+0.11
Colo.	+4.2	+3.7	+0.9	+2.1	-1.3	+0.7	-1.43	-0.40	+0.31	+0.48	+0.73	+0.42
N. Mex.	+4.2	+3.0	+1.1	+1.1	-1.8	-0.3	-0.95	+0.19	-0.45	+0.78	+0.51	+0.45
Ariz.	+2.2	+3.6	-1.5	+1.2	-1.4	-1.9	+0.18	-0.13	+0.83	-0.43	-0.18	+0.82
Utah	+2.2	+4.1	-2.6	+1.6	-1.6	-1.1	-0.04	-0.40	+1.38	+0.32	+0.62	+0.37
Nev.	+1.7	+4.0	-0.4	+1.6	-2.7	-2.9	+0.61	-0.08	+0.67	+0.56	+0.45	+0.34
Idaho	+2.7	+3.9	+0.3	+2.9	-1.4	-0.5	+0.31	-0.24	+0.38	+0.01	+0.38	+0.42
Wash.	+2.5	+3.0	+1.4	+2.7	-0.5	+0.6	-0.13	-0.17	-0.50	-0.52	-0.16	-0.62
Oregon	+2.6	+3.2	+1.3	+2.9	-1.2	-0.2	+0.55	+0.32	-0.27	-0.34	+0.18	+0.23
Calif.	+0.2	+1.8	+1.0	+1.4	-1.4	-3.1	+1.16	+0.67	+0.27	+0.08	+0.13	+0.01

INTRODUCTION

The summary of the occurrence of diseases of field and vegetable crops in the United States in 1925, which follows, is based upon information received from several sources, among which are the reports of collaborators, data contributed by state and federal pathologists, and the published results of recent work. The value of the summary is dependent largely upon the completeness and accuracy of the reports received from collaborators, therefore, it is highly desirable that the records submitted be made as full and exact as possible.

OUTSTANDING OBSERVATIONS

One of the most noteworthy observations in 1925 was the effect of the unusually dry summer upon the occurrence of certain diseases. This was especially noticeable in the case of cotton anthracnose. The losses reported in 1925 ranged from a trace to 1 per cent, whereas in 1920 when precipitation was high, the losses estimated were from one to 15 per cent. Potato late blight, cantaloupe leaf blight, and tomato leaf spot also caused much less loss than during years of average rainfall.

A gratifying observation is the fact that the losses from several important diseases are being reduced through the practice of seed selection and treatment, use of resistant varieties, sanitation, care in handling, spraying and dusting, and other control measures. The most striking instances of this can be found in the case of sweet potato black rot and storage rots. In the first instance losses have been reduced from 5.64 per cent in 1919 to 1.8 per cent in 1925, while with storage rots the losses decreased from 30.3 per cent in 1918 to 6.9 per cent in 1925. Other diseases, the losses from which have been lowered by the application of control measures, are potato scab and mosaic, tomato wilt, cabbage yellows, cantaloupe blight, celery blight, watermelon anthracnose, and tobacco wildfire and blackfire.

DISEASES OF POTATO

SPRAYING AND DUSTING FOR POTATO DISEASES

Spraying with Bordeaux combined with arsenicals continues to be regarded as necessary in most regions for the profitable production of potatoes. Dusting with copper-lime dust combined with arsenicals has given satisfactory results in some cases; but generally it has not given as good control of late blight and hopperburn as has spraying.

In Maryland spraying with Bordeaux is gradually being adopted by the best growers of late potatoes, resulting in a decrease in the losses from diseases, especially late blight and hopperburn.

In South Carolina Bordeaux sprays and dust are being used effectively, according to Fenner. Butler in New Hampshire (2) found that Bordeaux applied at 90 pounds pressure did not give as satisfactory control of blight as it did when applied at 180 pounds pressure. He also found that best results were obtained when the nozzles over the center of the row were directed upon it perpendicularly to the line of motion or at an acute angle, never an obtuse angle, to it.

Dean (4), after twenty years personal experience, believes that late blight can be controlled only by frequent and thorough spraying of the plants throughout the growing season.

Dimock (6) obtained five out of seven crops free from decayed tubers by dusting. He believes that wherever the water supply is limited or difficult of access or labor is high priced, dust should replace wet spray.

Wallace (9) began experimental work with dusts in 1917. None of the dusts used previous to 1924 gave satisfactory results under the conditions of their application, but during that year fairly satisfactory results were secured from certain dusts especially when they were applied between three and five o'clock in the morning.

Recent literature

1. Anon. Sprays outrank dusts for potatoes. New York (Geneva) Agr. Exp. Sta. Bul. 518: 4 pp. 1925.

2. Butler, O. R. Field crops experiments in New Hampshire, 1924. New Hampshire Agr. Exp. Sta. Bul. 216: 16-18, 32, 33. 1925.

3. Clinton, G. P. Report of the Connecticut State Station Department of Botany. Connecticut State Agr. Exp. Sta. Bul. 264: 207-210. 1925.

4. Dean, D. Spraying in 1925. Potato News Bul. 2: 193-196. May 1925.

5. ______ High pressure spraying machinery. Proc. Potato Assoc. America 11: 84-86. 1925.

6. Dimock, J. A. Potato dusting vs. spraying in Vermont. Proc. Potato Assoc. America 11(1924): 74-76. 1925.

7. Martin, W. H. Potato spraying vs. dusting in New Jersey. Proc. Potato Assoc. America 11 (1924): 67-74. 1925.

8. Tilford, P. E. Potato spraying and dusting in 1924. Mo. Bul. Ohio Agr. Exp. Sta. 10: 20-22. 1925.

9. Wallace, Errett. Seven years tests with commercial dusting materials against potato blight. Proc. Potato Assoc. America 11 (1924): 86-95. 1925.

Seed treatment continues to be a valuable method for the control of certain potato diseases, especially for Rhizoctonia and scab. The data received on the subject of seed treatment are included in the discussion of these diseases.

Recent literature (see also references under Scab and Rhizoctonia)

1. Cross, L. J. A field test of mercuric chloride solution in potato seed treatment. Phytopath. 15: 241-242. 1925.

2. Heckmanns, F. Zur Frage der Kartoffelbeizung mit Uspulun und Uspulun-bolus. Illus. Landw. Zeit. 44: 247-249. June 13, 1924.

3. Lohmann, J. Reizwirkungen chemischer Verbindungen auf die Keimung der Kartoffelknolle. (Stimulatory effects of chemical compounds on the germination of the potato tuber.) Landw. Jahrb. 61: 1-44. 1925.

4. Martin, W. H. The use of organic mercury dust for disinfecting seed potatoes. Proc. Potato Assoc. America 11(1924): 116-121. 1925.

5. Porter, D. R. The introduction of the hot-formaldehyde treatment for seed potatoes in Iowa. U. S. Dept. Agr. Office Coop. Exten. Work Ext. Pathologist 3: 6-11. Jan.-Feb. 1925.

6. ________ Potato seed treatment in the Kaw Valley. Potato News Bul. 2: 270-273. July 1925.

7. Quinn, J. T. Investigations with seed potatoes. Missouri Agr. Exp. Sta. Bul. 228: 61. 1925.

8. Rosa, J. T. On the preparation of mercuric chloride solutions. Proc. Potato Assoc. America 11(1924): 113-115. 1925.

POTATO SEED CERTIFICATION

Potato seed certification continues to be the best method which has been devised to encourage and increase the use of healthy, vigorous potato seed.

The report of the Seed Potato Improvement Committee for 1924 (6) is of interest. The committee, through Chairman Werner, sums up the seed certification work, as regards noticeable changes or advancement as follows:

1. Increased number of field inspections.
2. Improved grading of certified seed.
3. More rigid control of virus diseases because of better knowledge of symptoms and control methods.
4. Use of trial plots for checking the quality of the work and the efficacy of the standards, also as a direct aid to actual inspection work.

5. Very great increase in the volume of certified seed produced.

Recent literature

1. Krantz, F. A. Potato improvement by selection in self-fertilized lines. Potato News Bul. 2: 303-304. August 1925.

2. Martin, W. H. Potato improvement work in 1925. Hints Potato Grow. New Jersey State Potato Assoc. 5^{12}: 1-2. April 1925.

3. Myers, C. H. How to improve the yield and quality of seed potatoes by selection and to maintain such improvement. Proc. Potato Assoc. Amer. 11(1924): 5-14. 1925.

4. Sanders, V. A. Estimated crop of certified seed potatoes in northeastern region gains 155 per cent over 1923. Potato News Bul. 2: 24-26. 1925.

5. Talmage, H. R. How can best strains of a variety of seed potatoes be located and maintained? Proc. Potato Assoc. Amer. 11(1924): 15-20. 1925.

6. Werner, H. O. Report of seed potato improvement committee. Proc. Potato Assoc. Amer. 11(1924): 130-136. 1925.

LATE BLIGHT CAUSED BY PHYTOPHTHORA INFESTANS (MONT.) D BY

With the exception of New York and Maine, collaborators' reports indicate that the losses from late blight throughout the country were much less than usual. At one time it was reported serious in Florida but later reports indicated that this condition was not general.

Table 1. Estimated average percentage loss from and relative prevalence of late blight in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
N. Y.	20	More	More	W. Va.	Trace	Less	Less
Maine	5	--	--	S. C.	Trace	Less	Less
Md.	3	Same	Less	Mich.	Trace	Less	Less
N. H.	1	--	Less	Iowa	Trace	--	--
N. C.	1	Less	Less	Ky.	--	Same	Same
Conn.	0.5	More	Same	Ga.	--	Less	Less
Ohio	0.5	Less	Same	Fla.	--	Less	--
Calif.	0.1	Same	--	Wis.	--	Less	Less
Mass.	Trace	Less	Less				

Table 2. Dates and places of first appearance of late blight as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 13	South Carolina	Charleston	July 27	New York	Tompkins
July 19	Massachusetts	Amherst	Aug. 22	Wisconsin	Amherst
July 25	Connecticut	Storrs	Sept. 25	Michigan	Paw Paw

Weather relations

The absence of late blight throughout the country was probably due to the low precipitation and high temperature which prevailed during the growing season, especially during August and September (See Table A). New York is the only important potato growing state in which there was an appreciable increase in rainfall over normal for September (+1.49 inches) combined with almost normal temperature (+0.6°F.). The normal September temperature and rainfall in New York are usually favorable for late blight development provided there is sufficient moisture earlier in the season to favor the growth of the fungus. It will be noted in table A that the rainfall for New York during July was almost an inch above normal (+0.89 inch). This combination of conditions probably accounts for the severe losses from late blight, especially from tuber rot, reported in that state.

Maine: According to Folsom 1925 was one of the worst blight years since 1909.

Connecticut: Late blight present only in a minor way and came too late to cause much injury, either to vines or as rot of tubers. (Clinton)

New York: Most of the loss was due to tuber rot, but many of the fields died prematurely and thus reduced the yield. The worst rot was in Genesee County. It was a common sight to see from 50 to 200 bushels of rotted tubers an acre, left lying on the ground. (Chupp, Barrus, and Fernow)

Maryland: Late blight is almost always more or less severe in the Allegheny Mountains, especially in Garrett County. Those who spray thoroughly with Bordeaux usually check its development but losses are usually large in untreated fields. (Jehle & Temple)

Florida: The most serious trouble we had was late blight. The fungus seemed to be particularly virulent this year and did serious damage even when it seemed weather conditions were decidedly unfavorable. (L. O. Gratz, May 7)

Not as important during the past season as the year before, in fact, very little damage was caused in the Hastings Section. (Weber)

Wisconsin: The least amount of rot since 1916. (Vaughan)

For control see section on potato spraying

Recent literature (See also literature cited under spraying)

1. Butler, O. Effect of spray pressure and number of nozzles on late blight of potatoes. New Hampshire Agr. Exp. Sta. Circ. 24: 4pp. 1925.

2. Gratz, L. O. Blight diseases of Irish potatoes. Florida Grow. 31[10] 20. March 7, 1925.

3. Leonian, L. H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

4. Murphy, Paul A., and Robert McKay. Further experiments on the sources and development of blight infection in potato tubers. Jour. Dept. Lands & Agr. Ireland 25: 10-21. 1925.

5. Simonet. Note sur le Phytophthora infestans. Jour. Soc. Nat. Hort. France IV, 26: 272-274. July 1925.

6. Stacchiotti, U. Attenti alla Peronospora della patata (Phytophthora infestans). Istria Agr. n. s. 5: 245-248. June 15, 1925.

7. Watkins, W. R., et al. Farmers' experiment plots. Potato trials, 1924. Agr. Gaz. New South Wales 36: 269-279. 1925.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT

Reports from collaborators indicate that although early blight was present in practically all potato growing regions, it was not responsible for any severe reduction in yield. It was reported to be more prevalent than usual in Delaware, Ohio, Michigan, Nebraska, and Oklahoma. The largest loss was reported from New Mexico, where the disease was said to be most prevalent at high altitudes in Otero County. Varieties reported to be most susceptible are Early Ohio, Green Mountain, Cobbler, and Bliss.

Table 3. Dates and places of first appearance of early blight as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 13	South Carolina	Charleston	July 7	New Jersey	Shiloh
May 16	Georgia	Pavo	July 30	Wisconsin	Spooner
June 3	Kansas	Lawrence	Aug. 10	New York	Ontario County
July 1	Michigan	E. Lansing			
July 7	New Hampshire	Rochester	Aug. 10	New Mexico	Cloudcroft

Table 4. Estimated average percentage loss from and relative prevalence of early blight in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
N. Mex.	6	More	More	Ga.	Trace	Less	Less
Ariz.	2	--	--	Minn.	Trace	Less	Less
Me.	2	--	--	Iowa	Trace	Same	--
Del.	1.5	More	More	N. Dak.	Trace	Less	--
N. C.	1.5	--	--	S. Dak.	Trace	Same	Same
Ohio	1.5	More	More	Kans.	Trace	Same	Same
Va.	1	--	--	Idaho	Trace	Less	Less
S. C.	1	--	--	N. J.	-	Less	Less
Ala.	1	Same	Same	Fla.	-	Same	--
Mich.	1	More	Same	La.	-	Less	Less
Md.	0.5	Same	Same	Okla.	-	More	--
Conn.	0.25	Same	Less	Ind.	-	Same	--
N. H.	Trace	--	--	Wis.	-	Same	Same
Mass.	Trace	More	Same	Nebr.	-	--	More
N. Y.	Trace	--	--	Utah	-	Same	Same
W. Va.	Trace	Same	Same				

Collaborators' notes

Maine: Unusual epidemic on Green Mountains and other late varieties. (Folsom)

Massachusetts: Generally present but causing relatively little damage. (Osmun & Davis)

Maryland: Very prevalent on fall grown Cobblers in Worcester County. (Jehle & Temple)

Michigan: One case of Alternaria tuber infection observed, similar to that described by Folsom & Bonde (1). (Kotila)

Last year Folsom and Bonde (1) reported the early blight fungus, Alternaria solani, as the cause of a tuber rot. This year Gratz and Bonde (2) reported further results with tuber inoculations at the meeting of the American Phytopathological Society at Kansas City. Infection resulted when the tubers were inoculated and stored under either moist or dry conditions, the latter producing the most typical lesions. High percentages of infection were obtained under all conditions, but the best results were obtained by inoculating moist tubers and drying them before storing.

Recent literature

1. Folsom, Donald, and Reiner Bonde. Alternatia solani as a cause of tuber rot in potatoes. Phytopath. 15: 282-286. 1925.

2. Gratz, L. O., & Reiner Bonde. Alternaria tuber rot of potatoes. (Abstract) Phytopath. 16: 68. Jan. 1926.

SCAB CAUSED BY ACTINOMYCES SCABIES (THAX.) GUSSOW

Scab continues to be reported in practically all of the potato growing states. In 1925 the greatest losses were reported from a few of the middle western and eastern states. It was reported to be very severe in western Nebraska. Rosa reported an unusual amount of scab on the early crop in California and writes that it was more serious where the crop was irrigated than under non-irrigated conditions. In Maryland scab was unusually severe in fall grown Cobblers in Worcester County on the Eastern Shore.

Table 5. Estimated average percentage loss from and relative prevalence of scab in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year	State	Estimated percentage loss 1925	Prevalence compared with 1924	Prevalence compared with Average year
Kans.	10	Less	More				
N. Y.	7	--	--	N. H.	-	Same	Same
Va.	5	--	--	Conn.	-	Same	Same
Iowa	5	More	--	Mass.	-	Same	Same
N. J.	4	More	Same	Del.	-	More	More
N. C.	3	--	--	Ky.	-	Less	Less
Md.	2	Same	Same	S. C.	-	Same	Same
N. Mex.	2	Same	Same	Miss.	-	--	Same
Ariz.	2	--	--	La.	-	Same	Same
Ala.	1	Same	Same	Ohio	-	Less	Same
Minn.	1	Same	Same	Ind.	-	Same	--
Texas	0.5	--	--	Mich.	-	Same	--
Calif.	0.2	--	--	S. Dak.	-	Same	Same
Ga.	Trace	Same	Same	Utah	-	Less	Less
N. Dak.	Trace	Same	Less	Idaho	-	More	More

Table 6. Dates and places of first appearance of scab as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
June 1	Kansas	Topeka	Aug. 25	New Hampshire	Wolfboro
July 20	New Mexico	Mesilla Park	Sept. 1	New Jersey	Monmouth County
July 31	Connecticut	Westport			

Varietal susceptibility

In California, scab is reported to be more severe on Cobbler than on White Rose or Earliest-of-All. In Idaho, Idaho Rural and other white and red potatoes are said to be much more susceptible than Netted Gem. In Maryland, much more scab was found on Cobbler than on Jersey Redskin or McCormick.

Control

In Maryland, scab was checked to a large extent by seed treatment with bichloride of mercury. In Kansas, White reports that seed treatment gave practical control and that hot formaldehyde gave better results than bichloride of mercury. R. F. Crawford reports good control in New Mexico by using formalin, or Bayer's Organic Mercury Dust.

Recent literature

1. Anon. Rainfall and scab. Hints Potato Grow. New Jersey State Potato Assoc. 5: 7,8. Jan. 1925.

2. Barrus, M. F. Control of potato scab. Potato News Bul. 2: 107-108. March 1925.

BLACKLEG CAUSED BY BACILLUS PHYTOPHTHORUS APPEL

According to collaborators' reports blackleg was somewhat more destructive than usual, especially in some of the western and middle western states. Blackleg is usually restricted to local areas and reports from collaborators indicate that such is the case this year. Thus, in New Hampshire it was most prevalent in Coos County; in Maryland, in Worcester County; in Kansas, in the Kaw Valley; in Ohio, in the northern half of the state; in North Dakota, in the eastern part; and in West Virginia, in the Ohio Valley. In California it was reported to be localized in the San Francisco region and in Minnesota it was reported to be very bad in the northwestern part of the state. New York and Oregon report blackleg to be general and Delaware reports it on the early crop.

Table 7. Estimated average percentage loss from and relative prevalence of blackleg in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year
Maine	5	--	--
Minn.	3	More	More
Iowa	3	--	--
Kans.	3	More	More
N. Dak.	2	Same	Same
Md.	1	Same	Same
Va.	1	--	--
W. Va.	1	--	--
N. C.	1	--	--
Ohio	1	Same	More
S. Dak.	1	Same	Same
N. Mex.	1	--	--
N. Y.	0.5	--	--
Ariz.	0.5	--	--
Utah	0.5	--	--
Idaho	0.5	More	--
Conn.	0.25	Less	Less
Ind.	0.1	More	--
Mass.	Trace	Same	Same
Mich.	Trace	Less	Less
Wis.	Trace	--	--
Wash.	Trace	--	--
Calif.	Trace	--	--
N. H.	-	Same	Same
N. J.	-	Less	Less
Oregon	-	More	More
Del.	-	Same	Same

Table 8. Dates and places of first appearance of blackleg as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 18	Kansas	Topeka	June 8	New Jersey	Mercer Co.
May 19	Mississippi	Charles Co.	July 27	New Hampshire	Colebrook
May 21	North Carolina	Wayne Co.	July 31	New York	Genesee Co.
June 3	Indiana	Knox Co.	Aug. 10	New Mexico	Cloudcroft
June 5	Connecticut	Clintonville			

Reports of collaborators

Virginia: Numerous cases of blackleg appeared in May. It is certainly present to an alarming degree on both Canada and Maine stock. (McWhorter)

Florida: More or less conspicuous through the fields, causing a very small loss on the average. In certain fields it caused as much as 10 per cent reduction in yield. (Weber)

Oklahoma: Killing about two per cent of plants in a twenty-acre field of Irish Cobblers near Bixby. (Rolfs, July 1)

Ohio: Blackleg plants can be found in every field of late potatoes. It seems more prevalent in fields from northern grown seed. . . It has not been so prevalent this season as last, undoubtedly because of drier weather. (Tilford, Sept. 1 and Aug. 1)

Minnesota: Blackleg continues to be abundant, although dry weather has probably lessened the amount of tuber rot in the field. (Sect. Pl. Path.)

Indiana: One trainload of Cobblers and Ohios from Minnesota gave severe blackleg in many localities. (Gregory)

Kansas: Blackleg was much more severe than normal this year; causing almost a total loss in one field noted in Leavenworth County, and an average loss in the Kaw Valley of about three per cent. Practically all infection is early infection, causing death of plants on June 1 or before. Late infection is more or less rare. (White, Nov. 18)

Oregon: General and in some fields serious but losses will probably not exceed those of previous years. (Barss)

In one field at Lebanon, 20 per cent infection was noted. No treatment was used. Slimy rotted tubers were sorted out before planting in the spring. (McKay)

Kotila and Coons (1) have obtained successful results with inoculations on tomato and *Nicotiana rustica* with the blackleg organism. The tomato has been inoculated successfully by other investigators but *Nicotiana rustica* is a new host. Negative results were obtained from frequent inoculations into Petunia, *Solanum dulcamara*, *Datura stramonium*, *Physalis* spp., *Nicotiana tabacum*, and a solanaceous plant sold by seedsmen under the name of wonderberry (*Solanum nigrum*). The disease has not been observed by Kotila and Coons in nature on susceptible hosts other than potato.

Leach (2, 3, 4) has found that,

> "The seed-corn maggot (*Phorbia fusciceps* Zett.) is an agent of dissemination, inoculation, and hibernation of bacteria capable of causing blackleg. Bacteria are constantly associated with the insect and are necessary for the normal development of the larvae. Bacteria do not occur inside of the eggs, but are commonly present on the surface. Virulent pathogenic bacteria are present in the puparia and emerge with the adult. Pathogenic bacteria also are commonly present in the intestinal tract and excrement of adult flies. Eggs are deposited in the soil on or near healthy seedpieces or sprouts. On hatching, the maggots burrow into the seedpiece and inoculate it with bacteria which spread into the stem, causing blackleg. The insect has been responsible for outbreaks of blackleg in fields planted with carefully treated seed from fields known to have been free from blackleg. Control measures have not been devised." (4)

Recent literature

1. Kotila, J. E., & G. H. Coons. Investigations on the blackleg disease of potato. Michigan Agr. Exp. Sta. Tech. Bul. 67: 1-29. May 1925.

2. Leach, J. G. Corn maggot spreads the potato blackleg. Seed World 17: 20. April 24, 1925.

3. __________ The seed-corn maggot and potato blackleg. Science n. s. 61: 120. Jan. 30, 1925.

4. __________ The relation of the seed-corn maggot to potato blackleg. (Abstract) Phytopath. 16: 68. Jan. 1926.

STEMROT AND SCURF CAUSED BY CORTICIUM VAGUM BERK.& CURT.

The Rhizoctonia disease was reported by collaborators to be more prevalent than last year and than average years. The largest losses are reported from the middle western states, varying from 4 per cent in Minnesota to 10 per cent in Iowa. South Carolina also reported a loss of 10 per cent. Nebraska reports considerable.

Table 9. Dates and places of first appearance of stemrot and scurf as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
March 30	Georgia	Thomas Co.	May 22	New Jersey	Burlington
April 9	South Carolina	Sheldon	June 15	Michigan	Rhinelander
May 1	Kansas	Topeka	June 22	New Hampshire	Concord
May 21	North Carolina	Wayne Co.	July 13	New York	Genesee Co.

Table 10. Estimated average percentage loss from and relative prevalence of stemrot and scurf in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
S. C.	10	More	More	Va.	2	--	--
Iowa	10	More	--	N. C.	2	Same	--
Kans.	8	Same	Same	Wash.	2	--	--
Ky.	5	More	More	Utah	0.3	--	--
Mich.	5	Same	--	Conn.	0.25	--	--
Ariz.	5	--	--	Maine	Trace	--	--
N. Y.	4	--	--	N. H.	Trace	--	--
Ohio	4	More	More	W. Va.	Trace	Same	Same
Minn.	4	More	More	Ga.	Trace	Less	Less
N. Dak.	4	Same	More	Ala.	Trace	--	--
S. Dak.	4	Same	Same	Del.	-	Same	Same
Md.	3	Same	Same	La.	-	Same	Same
N. J.	3	More	--	Wis.	-	Less	Less
Idaho	3	More	--	N. Mex.	-	More	More
Calif.	3	More	More	Oregon	-	More	Same
Mass.	2	Same	Same				

It is of interest to note that many of the collaborators report a reduction in stand due to rotting of the seed pieces and killing of the sprouts.

New York: Onondaga County - Rhizoctonia injury was quite heavy, many weak and missing hills being the result. (D. D. Ward, N. Y. State Coll. Agr. Depts. Pl. Path. & Ent. Weekly News Letter, July 20.)

Maryland: There was a reduction of 10 to 25 per cent in stand in early Cobblers on the Eastern Shore due to Rhizoctonia injury of the sprouts and rotting of the seed pieces. (Jehle & Temple)

South Carolina: Moore states that it has caused a heavier loss to sprouting potatoes this season than ever before, many fields being entirely ruined.

Georgia (southern): Boyd states that there occurred an appreciable reduction in stand together with noticeable numbers of "weak" hills due to Rhizoctonia, especially in home gardens and small truck fields.

Ohio: In some fields there is a big loss due to Rhizoctonia. There are many missing and weak hills in such fields. Cankers or lesions are in abundance on the underground parts of these weak plants. (Tilford)

Wyoming: In the Laramie section Rhizoctonia was observed more than any other fungous disease, but was very slight in amount generally. (H. G. MacMillan)

Colorado: Rhizoctonia is generally prevalent in the Carbondale section, and while it did not cause a falling off in stand it resulted in an obvious disease picture in the field. In the Greeley district it was found on early planted and watered potatoes. The general and prevailing dryness and lack of irrigation water prevented the usual Rhizoctonia epidemic. (MacMillan)

Control:

It is gratifying to note that successful control with seed treatment is reported by many of the collaborators.

New York: Onondaga County - In many cases in field when untreated seed was planted, injury has been severe. (Ward, N. Y. State Coll. Agr. Depts. Pl. Path. & Ent. Weekly News Letter, July 27)

Maryland: The number of potato growers who treat their seed has been growing very rapidly during the past few years. This has resulted in a corresponding decrease in the amount of scab and Rhizoctonia. Bichloride of mercury is the most popular chemical used for treating seed potatoes. (Jehle & Temple)

South Carolina: Where seed treatment was practiced losses were light. (Moore)

Wisconsin: Corrosive sublimate and hot formaldehyde effective in control. (Vaughan)

Kansas: Eighty-eight per cent of plants affected in untreated fields and less than 20 per cent in treated fields. Hot formaldehyde gave better results than mercuric chloride. (White)

In Idaho (6) and Washington (4) wetting the tubers and keeping them moist 12 to 48 hours preceding seed treatment is recommended. It is claimed that by this means sclerotia on the surface are induced to germinate and made easier to kill by the treatment.

In New Zealand (2) the addition of concentrated hydrochloric acid to mercuric chloride solutions was found to kill all sclerotia. Treatments recommended are, - a five-minute immersion in 1 - 1250 mercuric chloride plus con-centrated hydrochloric acid at the rate of one part in 50 parts of the mercuric chloride solution, and covering the tubers in piles over night; or a sixteen-hour immersion in 1 - 8000 mercuric chloride plus concentrated hydrochloric acid at the rate of one part to 1000 parts of the mercuric chloride solution.

Recent literature

1. Baunache. Pflanzenschutzmittel u. - gerate. Betanal. Die Kranke Pflanze 2: 103-104. 1925.

2. Cunningham, G. H. Corticium disease of potatoes. New Zealand Jour. Agr. 30: 14-21, 93-96. 1925.

3. Dana, B. F. The Rhizoctonia disease of the potato. Washington Agr. Exp. Sta. Pop. Bul. 131: 5-30. 1925.

4. ________ The Rhizoctonia disease of potatoes. Washington Agr. Exp. Sta. Bul. (Techn. Paper) 191: 1-78. Aug. 1925.

5. Dorst, J. C. Vermeerdering van aardappel-Rhizoctonia in de natoelt door gebruik van stalmest. Tijdschr. Plantenz. 31: 115-118. May. 1925.

6. Iddings, E. J. Treatments for control of Rhizoctonia. In Idaho Agr. Exp. Sta. Bul. 135 (Ann. Rept. Director, 1924): 37. Jan. 1925.

7. Müller, K. O. Die Rhizoctoniakrankheit (Hypochnose) der Kartoffel und ihre Bekämpfung. Pflanzenbau 1924/25: 358-361. May 1, 1925.

8. Thomas, K. S. Onderzoeking over Rhizoctonia. Electr. Druk. 'De Industrie' J. van Druten, Utrecht, 98 pp. 1925.

9. Wellensiek, S. J. Infektieproeven met Rhizoctonia en Moniliopsis op tomaat en aardappel. Tijdschr. Plantenz. 31: 235-250. Nov. 1925.

WILT CAUSED BY FUSARIUM SPP.

The only states reporting losses greater than one per cent. from the wilt caused by Fusarium oxysporum Schlecht. this year are New Mexico, Utah, California, Arizona, and North Dakota. The seed piece rot was very destructive in the Greeley district of Colorado, according to H. G. MacMillan, who stated that together with the extreme drought it caused the replanting of practically all of the early crop planted in April and May, and that seed piece rot and wilt also caused a general reduction in stand in the late crop, estimated, as a result of many field counts, at about 20 per cent.

Table 11. Percentage reduction in yield due to Fusarium wilt of potato, as estimated by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
4	New Mexico	0.5	Maryland, Indiana,
3	Utah		Kentucky, Idaho,
2	California, Arizona		Texas, Ohio
1.5	North Dakota	Trace	New York, Virginia, West
1	South Carolina, Michigan,		Virginia, Georgia,
	Alabama		Minnesota, Washington

Wilt and stem-end rot caused by F. eumartii Carpenter was common and severe in Nebraska, according to Goss.

Recent literature

1. MacMillan, H. G., and G. A. Meckstroth. The critical temperature and infection of the potato seed piece by Fusarium oxysporum. Jour. Agr. Res. 31: 917-921. Nov. 15, 1925.

2. Small, W. Notes on species of Fusarium and Sclerotium in Uganda. Bul. Misc. Inform. Kew 1925: 118-126. 1925.

   Species of Fusarium resembling F. udum Butl. described from India and placed provisionally with that species; causes a potato rot, enters through wounds. This, and a species described as causing potato rot and wilt in India, very similar, both resemble F. radicicola Woll.

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

The entire country seemed to be free from bacterial wilt, according to reports from collaborators. Maryland is the only state reporting any loss and there it was only a trace. The only other states reporting its occurrence were South Carolina and Georgia.

WART CAUSED BY SYNCHYTRIUM ENDOBIOTICUM (SCHILB.) PERC.

Pennsylvania: There have been no outstanding occurrences of potato wart in Pennsylvania this year. The quarantine methods were followed out in the usual way, and by the use of the Spaulding Rose, which must be universally planted, there appears to be no opportunity for any multiplication of the organism.

The present wart quarantine involves portions of 11 counties in which 813 gardens in 58 towns and villages have been known to be infested with the wart. In the area under quarantine there are 134 farms, growing 141.5 acres of potatoes, and 14,803 gardens with a calculated area of 106.5 acres; or in all, the total area under potato production in the quarantined area is about 247 acres. In the Safety Zone surrounding the anthracite wart section, there are 1,356 planters, made up of 783 farms and 573 gardens. These are scattered in four counties. In 1925 the Safety Zone planted 42,841 bushels, of which 14,121 were of susceptible varieties (33.8%), and the remainder, 28,720, were immune (66.2%).

During 1925 a survey was made of towns and villages outside the present quarantined area to determine whether systematic inspection would disclose additional infections of wart. Parts of seven counties, including 56 towns, were thus covered. In these towns, 737 gardens growing potatoes were inspected, but no wart was found. It is interesting to note that 454 of these gardens were planted to susceptible varieties, and 283 to immunes. (McCubbin)

Maryland: The only new occurrence of wart reported in 1925 was one new infested garden found in the town of Lord which is within the present quarantined area. This brings the total number of infested gardens which have been found in Maryland to 20, located as follows: Dotmola 3; Charlestown 1; Midland 1: Eckhart Mines 3; Mount Savage 4; Lord 7; Welsh Hill 1. Immune varieties are being planted in all infested gardens. (Jehle & Temple)

West Virginia: There have been no special new developments in connection with potato wart in West Virginia during the last season. Our quarantine was maintained as usual, but the inspection service did not report any new locations during 1925. (Giddings).

VIRUS DISEASES

Recent investigations have demonstrated that there are many different virus diseases, with varying symptoms that are influenced greatly by environmental factors, sometimes being masked in such a way that they become very difficult to recognize.

Johnson (6, 11) has reported three different types of symptoms which he calls "mottle", "spot necrosis", and "ring spot", resulting in tobacco plants inoculated with an extract from apparently healthy potato plants. He was able to transmit the "spot necrosis" type back to the potato, where it produced an especially malignant disease, although loss of virulence of the infective principle followed repeated transfers through this host.

Schultz (13) has described a necrosis, resembling the so-called "streak" of potato, which developed from cross-inoculations between apparently healthy potato plants of different varieties. No mottling such as was described by Johnson was observed, however. Since Green Mountain and other American varieties used in this investigation are susceptible to "streak", but were not affected by the necrosis described, it appears that the latter is not the same as streak, although very similar to it.

Recent literature

1. Folsom, D., and E. S. Schultz. Methods to be observed to prevent spread of virus diseases in potatoes grown for seed stock. Proc. Potato Assoc. Amer. 11 (1924): 20-26. 1925.

2. Goss, R. W. Two important groups of Nebraska potato diseases. I. Potato wilt and tuber rots. II. 'Run out' potatoes caused by degeneration diseases. Nebraska Agr. Col. Ext. Serv. Ext. Circ. 1256: 1-23. 1925.

3. Goss, R. W., and G. L. Peltier. Further studies on the effect of environment on potato degeneration diseases. Nebraska Agr. Exp. Sta. Res. Bul. 29: 1-32. 1925.

4. Headlee, Thomas J. Dusting vs. spraying for the control of potato aphis. Proc. Potato Assoc. Amer. 11 (1924): 77-84. 1925.

5. Jaczewski, A. A. - - - - - (Degeneration diseases of the potato according to the results of the investigations made in 1924) Pamphlet published by the Central Potato Cooperation Union, Moscow, 1st issue, 65 pp. 1925. (Abstract in Rev. Appl. Myc. 4: 438. July 1925)

6. Johnson, James. Transmission of viruses from apparently healthy potatoes. Wisconsin Agr. Exp. Sta. Res: Bul. 63: 1-12. 1925.

7. Murphy, P. A., and R. McKay. Investigations on the leafroll and mosaic diseases of the potato. Jour. Dept. Lands & Agr. Ireland 25: 138-154. Aug. 1925.

8. Oortwijn Botjes, J. G. Het optreden van bladrol- en mosaiekziekte in den nabouw van gezonde aardappelplanten, die op grooten afstand groeien van zieke planten. (The occurrence of leafroll and mosaic in the progeny of healthy potato plants grown at a great distance from infected plants.) Tijdschr. Plantenz. 31: 1-6. 1925.

9. Patch, Edith M. Potato aphids. Maine Agr. Exp. Sta. Bul. 323: 9-36. 1925.

10. Quanjer, H. M., and D. L. Elze. Achteruitgang van pootgood van gelijke afstamming in de verschillende vroege-aardappeldistricte (Running-out of potatoes from the same seed stock in the various early potato districts.) Tijdschr. Plantenz. 31: 11-14. 1925.

11. Russell, H. L., F. B. Morrison, and W. H. Ebling. Apparently healthy plants produce mosaic disease. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 5-8. April 1925.

12. Salaman, R. N. Degeneration of the potato. - An urgent problem. Jour. Nat. Inst. Agr. Bot. No. 3: 39-51. 1925.

13. Schultz, E. S. A potato necrosis resulting from cross-inoculation between apparently healthy plants. Science n.s. 62: 571-572. Dec. 18, 1925.

14. ----------- Why potatoes run out. U. S. Dept. Agr. Farmers' Bul. 1436: 1-19. 1925.

15. ----------- and D. Folsom. Infection and dissemination experiments with degeneration diseases of potatoes. Observations in 1923. Jour. Agr. Res. 30: 493-528. March 15, 1925.

MOSAIC (CAUSE UNDETERMINED)

Reports from the various states indicate that there were greater losses from mosaic than from any other potato disease in 1925.

Table 12. Estimated reduction in yield of potatoes due to mosaic as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
15	Arkansas, Louisiana	2	Iowa, Kansas, New Mexico
10	New Hampshire, Maryland, Washington	1	Virginia, Michigan, Minnesota, North Dakota
9	Utah	0.5	Delaware, Indiana
8.5	Idaho	0.25	Connecticut
8	Georgia	0.1	Texas.
5	North Carolina	Trace	West Virginia
4	South Dakota		
3	Ohio, Massachusetts		
2.5	Maine, New York, Alabama		

Arkansas, Louisiana, Maryland, New Hampshire, and Washington report the largest losses. In Maryland this was due mostly to the severity of mosaic in the native strains of the McCormick potato used extensively for late planting, but the disease was also very abundant on the Green Mountain, Gold Coin, and Rural varieties. In Wisconsin and Arkansas mosaic was reported to be very prevalent on Triumph, which is the variety mostly grown in the latter state.

The losses from mosaic and similar diseases would undoubtedly have been very much larger throughout the country had it not been for the improvement in quality and the increasing use of certified seed. This is especially noticeable in states where the growers have been taught to recognize these troubles by extension pathologists and other extension workers. During the potato tours which are organized annually in several states, growers observe diseases in the field and compare fields grown from the best and from inferior seed, with the result that there has been an increased demand for better seed. In 1925 Maryland, Louisiana, Alabama, Michigan, and Wisconsin, reported a reduction in losses from virus diseases due to this factor.

Olitsky and Northrop (3) report successful inoculation of "supposedly normal" tomato and tobacco plants with potato mosaic virus. They state:

> "We may conclude that the disease in potato plants can be transferred to tomatoes and tobacco from either the leaf or tuber. The signs in tomatoes and tobacco are identical, whether the inoculum is derived from plants which showed very marked mosaic or from those which exhibited signs so slight as to be dubious--a fact which should be borne in mind in the selection of mosaic-free plants, since potato plants are always propagated from tubers. Furthermore, the appearance of the experimental disease is identical with the natural affection in tomatoes and tobacco."

Reports of collaborators:

Delaware: Very common in home gardens where home seed selection is made. (Adams)

Maryland: Very serious on McCormicks. Many fields so badly diseased that they were not worth digging. (Jehle & Temple)

Kentucky: In Jefferson County a few fields were plowed up on account of degeneration troubles. (Valleau & Gardner)

Mississippi: Very few growers or seed dealers are using certified stock, as yet. (Neal)

Ohio: In fields from home grown seed, mosaic is quite evident. The mosaic that can be seen is of the severe rugose type. Seldom does a plant appear to have mild mosaic. Our temperature is such that the symptoms are masked. (Tilford, Aug. 1)

Wisconsin: Improvement is being secured by tuber indexing conducted by Experiment Station. (Vaughan)

Wyoming: Mild mosaic was present throughout the state in moderate amounts, mostly on seed potatoes or stock intended for seed. Extremely difficult of detection. Severe in some fields. (MacMillan)

Colorado: In the Carbondale district, the probable percentage of infection with mild mosaic varied from 5 to 100 per cent. In fields subjected to care, 15 to 20 per cent would be discovered. (MacMillan)

Oregon: Rugose mosaic spreads very rapidly. In 2-1/2 rows containing about 425 plants, 24 showing rugose mosaic were pulled out on June 18. Later in the season 60 plants showing current season symptoms were pulled out. Mild mosaic is not very important. (McKay)

California: The spring season was favorable for detection of mosaic and high percentages of mild and curly dwarf forms have been observed with serious reduction in yield. (Rosa)

Recent literature (See also references given under heading "Virus Diseases".):

1. Anon. Virus diseases of plants. Aphides and the tomato and potato mosaics. Fruit Grow. 59: 233-234. Feb. 12, 1925.

2. Iddings, E. J. Mosaic and leaf-roll of potatoes. In Idaho Agr. Exp. Sta. Bul. 135 (Ann. Rept. Director 1924): 35-36. Jan. 1925.

3. Olitsky, P. K., and J. H. Northrop. The inoculation of tomato and tobacco plants with potato mosaic virus. Science n. s. 61: 544-545. May 22, 1925.

4. Richards, B. L. Plant Pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

5. Russell, H. L., F. B. Morrison, and W. H. Ebling. Indexing potatoes to eliminate mosaic disease. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 8-9. April 1925.

LEAFROLL (CAUSE UNDETERMINED)

Leafroll is present in practically all of the potato growing regions of the country. In 1925 most of the collaborators reported its prevalence as about the same as usual. The largest losses were reported from New Hampshire, New York, New Jersey, Ohio, Indiana, New Mexico, and California. In Kentucky, according to Valleau, leafroll and mosaic together caused a loss of 40 per cent.

Table 13. Estimated percentage reduction in yield of potatoes due to leafroll as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
6	California, New Jersey	1.5	Idaho
5	New Hampshire, Ohio	1	Maine, Michigan, Georgia
4	New York, Indiana, New Mexico	0.5	Delaware
3	Massachusetts	Trace	Virginia, West Virginia, Minnesota, Iowa, Kansas, Texas, North Dakota
2.5	South Dakota		
2	Maryland, Utah, Washington		

In Maryland a rolling of the leaves which was almost identical in appearance with that due to leafroll was found on practically all of the plants in certain fields. The presence of virus diseases in these fields could be detected only when their symptoms were extremely pronounced. This trouble was very severe in plots grown from certified seed on the Experiment Station grounds at College Park, affected plants being dwarfed and rosette-like, with decidedly curled leaves of only about half the normal size. This condition is believed to be due to lack of moisture resulting from the drought which prevailed during the summer. Evidently a similar condition existed in New Jersey, since W. H. Martin stated (July 18) that, "Leafroll has been particularly severe but an accurate diagnosis of the disease has been made impossible owing to the large amount of leaf rolling resulting from moisture deficiency", and further (final report), "High temperatures and low moisture resulted in severe leaf rolling which resembled leafroll. On advent of wet weather the trouble disappeared." Barrus (1) ascribed a similar leaf rolling in New York to weather conditions. McWhorter observed a malnutrition trouble simulating leafroll on acid soils in Virginia.

As with mosaic, the losses from leafroll are being reduced greatly in many states by the use of certified seed.

Collaborators' reports:

New York: Most common near the lakes and less pronounced on elevations. Some seed growers are spraying or dusting their seed beds each week with nicotine to control aphis and leaf hoppers with the hope of preventing the spread of virus diseases. (Chupp)

Arkansas: Typical leafroll symptoms practically unknown. Probably masked under Arkansas conditions. (Dept. Plant Path.)

Ohio: Very common except in fields from disease-free seed. (Tilford, Sept. 1)

Indiana: Most important disease of the late crop. Main reason for the use of certified seed in Rural varieties. (Gardner)

Michigan: Not important in certified fields. Disease is common in uncertified stock, some fields of which show as much as 25 per cent. (Kotila)

Colorado: This virus disease is one of the most conspicuous in the Carbondale section, in symptoms usually being confused with Rhizoctonia. On the Russet Burbank, leafroll is quite evident. (MacMillan)

Oregon: Occurs in eastern Oregon; very uncommon in western Oregon, where it has been found only in several very widely separated fields, affecting only one or two plants in a whole field. (McKay)

Recent literature (See also references given under heading "Virus Diseases"):

1. Barrus, M. F. An account of seed troubles in some parts of New York State during the past month. Potato News Bul. 2: 315-316. 1925.

2. Campbell, Elmer G. Potato leaf roll as affecting the carbohydrate, water, and nitrogen content of the host. Phytopath. 15: 427-430. 1925.

3. Iddings, E. J. See mosaic.

4. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

5. Whitehead, T. Some experiments on potato leaf-roll transmission in Wales. Welsh Jour. Agr. 1: 184-188. Jan. 1925.

SPINDLE TUBER (CAUSE UNDETERMINED)

This disease, which rather recently has been recognized to be infectious was reported in 1925 in the three additional states of Ohio, Colorado, and California. Although it has been reported from the following states only, it probably occurs in the majority of states: Maine, Vermont, New York, New Jersey, Nebraska, Ohio, Florida, Michigan, Wisconsin, Washington, and California. In New York the reduction in yield from spindle tuber is estimated at 1 to 2 per cent of the crop and in Michigan as a trace.

Collaborators' reports:

New York: Quite common, especially on some strains. (Chupp)

New Jersey: Spindle tuber was commonly observed. Some lots of seed show as much as 30 per cent of this disease. (Martin)

Michigan: Disease observed in Irish Cobbler, Bliss Triumph, Early Ohio, Green Mountain, and Rural New Yorker varieties. (Kotila)

Nebraska: Spindle tuber again appears as the major disease in most sections. Only a small amount appears in certified fields but many commercial fields planted with common stock which had not been rogued or selected show very high amounts of spindle tuber. Some seed introduced from other states show over 50 per cent infection. (Goss)

Goss (4) has reported the results of some interesting experiments on transmission of spindle tuber, as follows:

> "Successful inoculations for spindle-tuber transmission were made in the greenhouse in 1924 by rubbing together freshly cut surfaces of infected and healthy potatoes. In 1925, under field conditions, 40 inoculations were made by cutting healthy seed with a knife previously used to cut infected tubers, and a similar number were made by rubbing together the cut surfaces of healthy and infected seed pieces. Both the healthy checks and the inoculated seed pieces were from the same healthy tubers and were planted in adjoining rows.
>
> "The contact inoculations resulted in 47.5 per cent infection, 45 per cent questionable infection and 7.5 per cent healthy as compared with 32.5 per cent, 47.5 per cent and 20 per cent respectively for the knife inoculations. In addition to the distinct symptoms on the tops and tubers, the yield also was reduced, the average of both sets of inoculations being 153 gm. per plant for the disease checks, 602 gm. for inoculated and infected plants, 962 gm. for those considered questionable infection, and 1154 gm. for healthy checks. Cutting knives and seed piece contact can transmit spindle-tuber, and they may prove to be sources of infection in the field."

Recent literature

1. Gilbert, A. H. Studies on spindle-tuber of the potato. Proc. Potato Assoc. Amer. 11 (1924): 101-102. 1925.

2. Gilbert, A. H. "Giant hill" potatoes a dangerous source of seed. A new phase of spindle-tuber. Vermont Agr. Exp. Sta. Bul. 245: 3-16. May 1925.

3. Goss, R. W. Effect of spindle-tuber disease on sprouting. Potato News Bul. 2: 261-262, 264. 1925.

4. ———————— Transmission of potato spindle-tuber disease by cutting knives and seed piece contact. (Abstract) Phytopath. 16: 68-69. Jan. 1926.

5. Werner, H. O. Relation of environment to spindle-tuber symptoms. Proc. Potato Assoc. Amer. 11 (1924): 102-106. 1925.

6. ———————— The spindle-tuber disease, one cause of "run out" seed potatoes. Nebraska Agr. Exp. Sta. Bul. 207: 1-21. 1925.

OTHER VIRUS DISEASES

WITCHES' BROOM (UNDET.) (3) was reported in 1925 from Idaho, Washington, and Oregon. Idaho, "Less than usual or than last year. Very important in some fields. Most common in northern part of the state, but found also in south" (Hungerford). Oregon, "Not very widespread; rather general in the Willamette Valley, with more in the lower part (Washington, Multnomah, and Clackamas Counties). Reduces yield to practically nothing in plants from diseased tubers. Generally occurs in only small percentages, but up to 30 per cent has been observed in some plantings. Only very occasionally is much present, however" (McKay).

GIANT HILL (UNDET.). Results of studies on giant hill are reported by A. H. Gilbert as follows (2):

> "As a result of field and greenhouse observations covering a period of two years, the following conclusions have been reached: Giant hill is a degeneration disease causing a certain set of symptoms in potato vines and resulting in the production of tubers of undesirable shapes for seed and market purposes. It is similar in its effects upon tuber shape to a recently described disease known as 'spindle-tuber'. The foliage symptoms, however, are distinct from those of spindle-tuber." (page 4)
>
> "The fact that giant hill tubers exhibit the same tendencies as to shape as have previously been demonstrated by means of rather numerous data for spindle-tuber, furnishes support for the conclusion that giant hill is a new phase of spindle-tuber or at least is somewhat closely related to it as indicated by its effects upon the potato plant." (page 10)

"YELLOW-TOP, UNDET. (DEGENERATION DISEASE). Trace in Maine, apparently introduced in certain Canadian stocks. Previously reported in certain old central Maine stocks." (Folsom)

Recent literature (See also references given under heading "Virus diseases"):

1. Atanasoff, D. New studies on stipple-streak of potatoes. Phytopath. 15: 170-177. 1925.

2. Gilbert, A. H. "Giant hill" potatoes a dangerous source of seed. A new phase of spindle-tuber. Vermont Agr. Exp. Sta. Bul. 245: 3-16. May 1925.

3. Iddings, E. J. See mosaic.

YELLOW DWARF (CAUSE UNDETERMINED)

Yellow dwarf was reported to be much less prevalent than last year in New York. Chupp states that, "For some unknown reason, there was little or no yellow dwarf even in fields where it occurred abundantly each year since 1917. The only possible explanation is that the weather was not favorable for its development."

TIPBURN AND HOPPERBURN

In 1925 the largest losses from tipburn and hopperburn were reported from West Virginia, New York, and Arkansas. Other states reporting greater losses than during the average years are New Hampshire, New Jersey, Wisconsin, and New Mexico.

Table 14. Percentage losses from tipburn and hopperburn of potato as estimated by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
17	West Virginia	2	New Hampshire, South Carolina
10	New York, Arkansas		
6	South Dakota	1	Maryland, Michigan, Texas
5	Virginia, Georgia, New Jersey	1.5	Arizona
		0.25	Connecticut
4	New Mexico	Trace	Kentucky, Kansas, Utah, Idaho
3	North Carolina		

Collaborators in Maryland, Ohio, and New Mexico reported satisfactory control from spraying with Bordeaux mixture.

Reports of collaborators:

New York: Tipburn and hopperburn very serious. Much less on potatoes planted after the first week in June and also on potatoes grown at higher altitudes; almost none above 1500 feet. (Chupp)

West Virginia: Hopperburn very important; general and severe even in the most elevated sections of the state. Most severe on early potatoes. Unusually dry and hot during June and July. Leaf hoppers very numerous. (Sherwood & Giddings)

Georgia (southern): Tipburn caused severe injury on Bliss during May; most prominent on poor quality seed. Common all over the Coastal Plain, but most severe in the northern part where it was hotter and drier. (Boyd)

Arkansas: Tipburn, not associated with leaf hopper, very prevalent, more than average. Extreme dry weather through potato growing season appears certainly to be connected with it. Late potatoes were a complete loss in many cases. (Dept. Plant. Path.)

Wisconsin: Hopperburn statewide, a major leaf trouble, more this year. Worse on potatoes planted early. In general, injury most severe on early varieties. (Vaughan)

OTHER DISEASES AND INJURIES

Armillaria mellea (Vahl) Quel., mushroom root rot. Oregon, Washington County, not important. McKay reports, "A few tubers are found every year. The highest amount ever reported was 3 per cent of the tubers in a field located in an old prune orchard. It always occurs either on old prune orchard land where root rot had been present, or on land cleared from timber, especially oak."

Colletotrichum atramentarium (Berk. & Br.) Taub., anthracnose, black dot, stem canker (5, 6, 9). New York, observed occasionally in Wyoming and Allegany Counties; Virginia, specimen sent in from Norfolk County by McWhorter.

Heterodera radicicola (Greef) Muell., rootknot. Losses from rootknot reported were; - California 5 per cent, Georgia (southern) 3 per cent, Texas, one-half per cent. Georgia, "Destructive in a few gardens, common in some field plantings. Causes stunting of plant, undersized, pimply, and knobby tubers, easily invaded by other organisms. Common in the Coastal Plain." (Boyd). Oregon, "This trouble is not known to be established and causing damage in any field, although several authentic cases of its occurrence at various times are known. ~~In 1925 it was reported by E. R. Jackman of Oregon Agricultural College as occurring in one lot of potatoes observed in Benton County, not severe."~~ (McKay). California, "Occurs in all potato regions." (Milbrath).

Phoma tuberosa Melhus, Rosenbaum, & Schultz, tuber rot. Specimens determined by Freeman Weiss, sent in from Pennsylvania in April yielded this fungus, Fusarium spp., Alternaria, and Clonostachys. The Alternaria was obtained from lesions with unbroken skin. The tubers were seed stock.

Pythium debaryanum Hesse, leak. Idaho, "Always important in midseason crop when not handled properly; more reports this year than in previous years." (Hungerford). Washington, "A number of cases on potatoes in storage." (Dept. Plant Path.). California, "Stockton Delta region, three-tenths per cent loss." (Milbrath).

Rhizopus sp., leak. Washington.

Sclerotium rolfsii Sacc., stem rot, Southern blight, caused losses of one-half per cent in Georgia and in Texas, and was reported also from Florida and Mississippi.

Spondylocladium atrovirens Harz, silver scurf. New York (trace), Virginia, Idaho, Washington.

Verticillium alboatrum Reinke & Berth., wilt. New York, "Present, but not distinguished from Fusarium wilt" (Chupp). Virginia, "A large percentage, as judged by cultures made in several localities, of the potato wilt prevalent in local plantings of northern grown seed is due to Verticillium" (McWhorter, Truck (Norfolk) Exp. Sta.). Also reported from Oregon.

Bacterial tuber rot. Connecticut, "Bacillus carotovorus Jones. One report of seed rotting in field somewhat, one of rot following blight; also found on Connecticut potatoes in transit" (Clinton). New York, "1 - Bacillus carotovorus ? A soft colorless rot was found in a few fields before late blight was present. 2 - A firm brown rot resembling but different from late blight rot, cause unknown, probably bacterial, caused considerable loss. Probably bacterial soft rot following late blight rot, according to Barrus. Late rains favored the disease greatly." (Chupp)

Marginal burning, leafspot, and leaf drop, cause unknown. Oregon, "Burning of the edge of leaf in spots coalescing around the margin, followed by spotting of the entire leaf, and finally by dropping of the lower leaves, was rather general in western Oregon and of considerable importance in individual hills, causing losses of 30 per cent in some hills. Sometimes one plant in a hill would be affected and the others free. According to E. R. Jackman of Oregon Agricultural College Extension there was less wherever there was sufficient potash." (McKay)

Calico (undet.). Nebraska, "A few scattered plants resembling Hungerford's description of calico have been found in occasional fields." (Goss). Idaho, "More reported than usual" (Hungerford). Oregon, "Calico has occurred in eastern Oregon for several years, in noticeable although only small percentages. It was never seen in western Oregon until 1924, when two or three plants in an experimental plot in Multnomah County, planted with seed from Malheur County (eastern Oregon), showed calico." (McKay).

Weather injuries. Drought (see also under leafroll) caused considerable loss in a number of states, including New Jersey, Maryland, West Virginia, and Idaho. Frost injury (7) was reported from Wisconsin and Washington. Oedema due to excessive moisture occurred in Washington. Lightning injury was reported from New York.

Streak (cause unknown), found in occasional fields, mostly on Long Island, although some in up-state fields, in New York. Caused a trace of loss. (Chupp)

Heat necrosis and net necrosis each caused a loss of one-half per cent in California, according to Milbrath. Black heart was reported from New York (trace to one per cent loss), Wisconsin, and Washington. Internal browning (1), California and Washington. Hollow heart (8), Washington. Scald of two types, one occurring in the ground before digging, and another caused by tubers lying on the ground too long after digging and picking, reported from the Hastings section of Florida by E. J. Conklin, Jr., (U. S. Dept. Agr. Bur. Agr. Econ. Fruit and Veg. Div. Letter 6: 210-211. May 8, 1925). Jelly-end rot, (undet.), Idaho and California. Physiological wilt, Virginia.

Recent literature:

1. Anon. Internal brown fleck in potatoes. Jour. Dept. Agr. South

Africa 10: 292-294. April 1925.
Application of lime some months before planting seems to control disease.

2. Appleman, C. O., and W. D. Kimbrough. Physiological shrinkage of potatoes. Proc. Potato Assoc. Amer. 11 (1924): 66-67. 1925.

3. Barrus, M. F. An account of seed troubles in some parts of New York during the past month. Potato News Bul. 2: 315-316. 1925.

4. Buckhurst, A. S. Notes upon bulb mites and eelworms. Jour. Min. Agr. Great Britain 32: 734-738. Nov. 1925.
Stem eelworm (Tylenchus dipsaci) attacking tubers, and beet eelworm (Heterodera schachtii) attacking small roots and rootlets but not tubers. (See also reference 11).

5. Dickson, B. T. Colletotrichum v. Vermicularia. Mycologia 17: 213-217. Sept.-Oct. 1925.

6. ------------- Taxonomic studies of the organism causing black-dot disease of potato. (Abstract). Phytopath. 15: 300. May 1925.

7. Eastham, J. W. Vascular discoloration in tubers from vines killed by frost. Potato News Bul. 2: 108. March 1925.

8. Hardenburg, E. V. Hollow heart in potatoes. Potato News Bul. 2: 155-159. 1925.

9. Scott, G. A. Cultural characteristics of certain Colletotrichum species. Ann. Rept. Quebec Soc. Prot. Plants 16: 123-137. 1925.

10. Stapp, G. Der "Bakterienkrebs" der Kartoffeln. Arb. Biol. Reichsanst. Land.- u. Forstw. 13: 413-418. Feb. 1925.
Account of successful inoculation of sound tubers with Bacterium tumefaciens, forming tumors. Not likely to have any importance.

11. Strachan, J., and T. H. Taylor. Potato eelworm. Jour. Min. Agr. Great Britain 32: 941-947. Jan. 1926.
Eelworm similar to if not identical with Heterodera schachtii, known as beet eelworm on the Continent, but in England as potato eelworm since attack is mostly on potatoes. Attacks roots mostly but may also affect tubers at times. Of considerable importance. (See also reference 4)

12. Wright, R. C. Low temperature injury to potatoes in storage. Proc. Potato Assoc. Amer. 11 (1924): 54-59. 1925.

LEAFSPOT CAUSED BY SEPTORIA LYCOPERSICI SPEG.

The greatest losses in yield reported in 1925 were from Kentucky, Maryland, Delaware, Arkansas, and Indiana. In most cases leafspot was said to be less prevalent than usual or than last year. New Mexico and Texas were the only western states reporting losses.

Table 15. Estimated average percentage loss from and relative prevalence of leafspot in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
Ky.	20	More	More	Va.	2	Less	--
Del.	15	Less	Less	Ala.	2	Less	Less
Md.	15	Same	Same	Texas	1	--	--
Ark.	10	More	More	Ohio	0.5	Less	Same
Ind.	10	More	More	N. Y.	Trace	--	--
Iowa	8	Less	--	N. C.	Trace	--	--
Wis.	5	Less	Less	S. C.	Trace	--	--
Mich.	4	Less	Less	Ga.	Trace	Less	Less
N. Mex.	4	Same	Same	Minn.	Trace	Same	Same
Kans.	3.5	More	More	S. Dak.	Trace	--	--
N. J.	3	Less	Less	Conn.	-	Same	Less
W. Va.	3	Less	Less				

Table 16. Dates and places of first appearance of leafspot as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
July 14	Ohio	Tipton Co.	Aug. 1	Wisconsin	Madison
July 21	Delaware	Dover	Aug. 11	Connecticut	Cheshire
July 25	New York	Tompkins Co.			

Collaborators' reports

New Jersey: This disease was observed on the Earliana tomatoes early in June, but was checked during the drought which lasted throughout most of the summer. The disease was also observed in September and October on late crop tomatoes, but in most cases the fruit was mature before defoliation occurred and heavy losses did not occur. (Poole)

Virginia: Present in only a few localities. Except in Richmond region, only a few infected plants observed. (McWhorter)

West Virginia: Leafspot generally present, but extensive damage only local. (Sherwood)

Kentucky: Leafspot was severe during the drought period but the plants made late growth in the fall and recovered to a great extent. (Gardner)

North Carolina: Present, but did little damage. (Lehman)

Florida: Collected only on the west coast where it caused considerable damage to certain fields; not generally distributed. (Weber)

Mississippi: Very small amount. Damage less than 1 per cent. (Beal)

Arkansas: Heavier defoliation than previously noted. Crop cut down seriously. (Dept. Plant Path.)

Indiana: Low temperatures of July and August retarded crop and gave the disease a chance to reduce leaf surface. Hot September resulted in sunscald of fruit on defoliated vines. (Gardner)

Michigan: Heavy rains in September and October responsible for late development and reduction in yield of late crop. Spraying not generally practiced. (Nelson)

Missouri: Observed by E. M. Page in many fields in south and southwest Missouri. Damage generally slight. Good control where tomatoes were sprayed. (Maneval)

Recent literature

Pritchard, Fred J. Tomato blight. Canning Trade 49 (14): 12, 14, 16, 18-20. Nov. 23, 1925.

FUSARIUM WILT CAUSED BY FUSARIUM LYCOPERSICI SACC.

Fusarium wilt was reported from all parts of the country but the greatest losses apparently occurred in the southeastern and south central states. In several states injury to plants in the greenhouse as well as in the field is reported.

Table 17. Dates and places of first appearance of Fusarium wilt as reported by collaborators, 1925.

Date	State	Place	Date	State	Place
May 26	New York	Monroe Co.	July 14	Indiana	Howard Co.
June 13	Kansas	Manhattan	July 18	Virginia	State Colony
June 15	Georgia	Thomas Co.	July 21	Delaware	Dover
July 10	South Carolina	Calhoun	Aug. 5	Wisconsin	Milwaukee

Table 18. Estimated average percentage loss from and relative prevalence of Fusarium wilt in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
La.	15	Same	Same	Fla.	3	--	--
Ark.	15	--	--	Texas	3	--	--
Ala.	12	More	More	Utah	3	Same	More
N. J.	10	More	--	N. Y.	1	--	--
Ill.	10	--	--	Ind.	0.2	Same	Less
Kans.	10	Same	Same	Del.	Trace	Less	Less
Md.	7	More	More	W. Va.	Trace	Same	Same
N. C.	6	Same	Same	Mich.	Trace	More	Same
Ohio	6	Less	Less	Wis.	Trace	--	--
S. C.	5	Same	Same	N. Dak.	Trace	Same	Same
Ga.	5	Less	Less	S. Dak.	Trace	--	--
Ky.	4	Same	Same	Wash.	Trace	--	--
Va.	3	More	--				

Collaborators' reports

New Jersey: This disease was more severe than any of the past few years. It occurred in many fields, where isolated spots frequently showed 100 per cent loss. In some instances the plants were killed before the first set was mature, but frequently the plants were not killed until some fully ripened tomatoes were produced. The losses were greatest in Gloucester County where the Earliana and Acme varieties are grown on the sandy soils. The canhouse crop, being grown on heavy soil types, has never been severely affected. (Poole)

Virginia: More prevalent and destructive than in average season. The hot dry weather has favored its development. (Fromme)

Kentucky: Growers of canning tomatoes, if they raise their own plants, seem to have little difficulty with wilt, but where plants are supplied from a central point there appears to be more trouble. (Gardner & Valleau)

South Carolina: Present, apparently about as usual. (Ludwig)

Georgia (southern): Less prevalent than in 1924, although few small commercial fields showed from 1 to 10 per cent. Most common in gardens. Showing worse on second planting than in first. Estimated loss to early crop 2 per cent. (Boyd, July 15)

Florida: Wilt was common in many fields during the past season, generally over the state, probably second in importance to nailhead. (Weber)

Mississippi: Serious where wilt-resistant varieties are not used. (Neal)

Drought injury together with wilt heavy. Ten per cent loss. (Beal)

Texas: Generally prevalent throughout east Texas. More conspicuous due to dry season. (Taubenhaus)

Oklahoma: This organism is more or less plentiful in nearly all sections of the state, and in some it is practically impossible to grow the standard varieties. (Rolfs)

Arkansas: Important. Appeared early in southern and central Arkansas. Many home gardens of tomatoes are a complete failure. Canning crop is late and not as much reported as usual. (V. H. Young, Aug. 1)

Ohio: This disease caused considerable loss in greenhouses this season and especially in those greenhouses that were not thoroughly steamed. The loss outside seems to be less than common. (H. C. Young)

Loss below normal in northern section of the state but very severe in the southern part. (Thomas)

Indiana: Occurred to some extent in southern grown plants throughout the state but cool July and August checked its severity. (Gardner)

Michigan: Confined to local areas in southernmost counties and occurs mostly on light soils. Not important commercially except in greenhouses. (Nelson)

Wisconsin: Rare; seen in a few gardens near Milwaukee. (Vaughan)

Utah: Very important in Davis and Weber counties. Complete failure of crop in certain fields. (Richards)

In Missouri (9) experiments for the control of wilt were conducted by attempting to change the hydrogen-ion concentration of the soil by using lime, rendering the soil unsuitable to the growth of Fusarium lycopersici. Tomato plants of a susceptible variety were set in the treated soil but marked wilting was noted after thirty days. Soil samples taken three inches below the surface showed pH values practically identical with untreated soil.

Pritchard (5) states that wilt is disseminated chiefly through seed and plants. He says that tomato seed produced on wilt infested soil is quite commonly infected by the wilt fungus (Fusarium lycopersici) and that this often happens in wilt-resistant varieties.

The most satisfactory method for the control of Fusarium wilt is the use of resistant varieties. Fortunately a number of such varieties have been developed by different workers. Pritchard (5) reports the development of three promising new wilt-resistant varieties, the Marvana, Marvelosa, and Marglobe. Favorable results from the use of wilt-resistant varieties are reported from California (2), Missouri (6), and Utah (7).

Statements from collaborators concerning the use of resistant varieties are as follows:

North Carolina: Marvel and Norton varieties proved effective in controlling this disease. (Fant)

Alabama: Wilt resistant varieties satisfactory and these are being grown some by truckers and gardeners. (Blair & Miles)

Mississippi: Serious on susceptible varieties. Norton proving popular and resistant. (Beal)

Louisiana: More general use of resistant varieties is decreasing the loss. (Tims)

Arkansas: Resistant varieties successful where used. (Dept. Plant Path.)

Kansas: Louisiana Red, Louisiana Pink, Kanora, recommended as giving good results. Marvana also. (White)

California: Wilt begins to show up in most sections of the state but the losses from this disease have not yet been serious this summer. It may partly be due to the fact that many growers are now using Norton variety when the infection of the soil with tomato wilt Fusarium is suspected. (Shapovalov, July 30)

Recent literature:

1. Edgerton, C. W., and E. C. Tims. Department of plant pathology. Louisiana Agr. Exp. Sta. Ann. Rept. 1924: 31-32. 1925.
2. Lesley, J. W., and Michael Shapovalov. Dodging wilt with resistant tomatoes. Pacific Rural Press 109: 39. 1925.
3. Norton, J. B. S. Some interesting work on tomato seed breeding and selection. Seed World 17: 12, 1925.
4. Pollock, N. A. R. Tomato wilt and resistant varieties. Queensland Agr. Jour. 23: 188-190. March 1925.
5. Pritchard, F. J. Tomato wilt and varietal resistance. Seed World 17: 7-9. 1925.
6. Quinn, J. T. Tomato seed selection for disease resistance. In Mumford, F. B. New knowledge. Missouri Agr. Exp. Sta. Bul. 228 (Ann. Rept. Director 1923/24): 59-60. Jan. 1925.
7. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.
8. Robb, O. J. ~~Hothouse~~ tomato growing. Canadian Hort. 48: 72-76. 1925.

9. Robbins, W. J., and Irl T. Scott. A study of certain fusarial diseases of plants.--Tomato Fusarium wilt. In Mumford, F. B. New knowledge. Missouri Agr. Exp. Sta. Bul. 228 (Ann. Rept. Director 1923/24): 42. Jan. 1925.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT AND NAILHEAD SPOT CAUSED BY MACROSPORIUM TOMATO CKE.

Three distinct types of injury are reported under this heading, the leafspot and fruit rot, the nailhead spot, and the collar rot. The largest losses from early blight reported are from Florida and Louisiana.

Table 19. Estimated reduction in yield of tomatoes due to early blight and nailhead spot, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
15	Florida	Trace	New Hampshire, New Jersey, Maryland, Kentucky, North Carolina, South Carolina, Arkansas, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Kansas, California
10	Louisiana		
5	Virginia, Georgia		
3	New York		
1.5	Michigan		
1	Maine, West Virginia, Texas		
0.5	Delaware, Alabama		

Leaf blight and fruit rot

The leaf blight form of the disease seemed to have caused larger losses than the fruit spot. In Virginia, Fromme reports it to have been an important cause of fruit drop. He says it persisted during the dry weather and was a more common cause of leaf blight than Septoria. In southern Georgia, Boyd reports early blight injury to have resulted mostly from defoliation, nailhead spot having been less important. In Indiana it was reported to be very serious locally. Michigan reported fruit rot destructive in local areas.

Nailhead spot

This fruit spot which seems to be limited to the southern states was reported to cause serious injury to tomatoes in 1925. Weber says:

> "This was by far the worst disease on the host plant in Florida, considering the damage done. It was severe in all sections of the state causing more loss on the east coast sections than elsewhere. Its severity was about the same as previous seasons there, while on the west coast the losses were less than the year before."

It was also reported from Georgia and Alabama.

Collar rot - See collar rot due to various organisms. (Page 39.)

Recent literature

Pritchard, Fred J. Tomato blight. Canning Trade 49 (14): 12, 14, 16, 18-20. Nov. 23, 1925.

YELLOW BLIGHT (CAUSE UNDETERMINED)

Yellow blight continues to be the most important tomato disease of the West, although Utah, Idaho, and Washington report less than last year. On the contrary, California and Oregon report it to be worse than last year and worse than average. In California the reduction in yield for the state was estimated at 25 per cent, in Idaho at 8 per cent, and in Washington at a trace.

Oregon: Very important in some localities. Chief limiting factor in tomato production. (McKay)

California: An unusually early and very severe attack of this disease has occurred, first appearances being noted at Modesto on May 20; at Lodi, June 1; at Davis, June 2; and near Davis, May 25. The earlier plantings were affected to a greater degree. The percentage of affected plants increased steadily through the month of June. Loss about 60 per cent on 20,000 acres. (Rosa)

There is another severe outbreak of western tomato blight in California. This year, however, the epidemic extends over a much greater area than it did last year. By the first week in July only 5 to 10 per cent of the plants remained in the majority of fields in the Sacramento and the Modesto sections and even less in Kern County. The conditions near Merced at that time appeared somewhat better and in a number of fields 40 to 50 per cent of the crop was still unaffected. The amount of blight in the Santa Clara Valley, south of San Jose and in the nearby sections, was not in excess of 20 per cent, and it was practically absent on the peninsula north of Santa Clara. In the vicinity of Riverside the disease has developed to date (July 30) to the extent of about 30 percent, but it is quite negligible in the coastal sections of Los Angeles and Orange Counties. The early part of the season this year was unusually cool, and this condition was apparently responsible for the extremely injurious effect of a hot and dry spell that followed. (Shapovalov, July 30)

Shapovalov (2) has published data which show a striking correlation between the rate of evaporation and the incidence of yellow blight. He states that, "Conditions which favor high rate of evaporation also favor severe outbreaks of this blight." It was shown by detailed weekly observations at Riverside and Shafter, California, that severe attacks of the disease were both preceded and accompanied by high evaporation. It is also significant that blighted plants which were not in the last stage of the disease tended to recover partially, very seldom completely, when the evaporation dropped to a low level for a time.

Recent literature:

1. Richards, B. L. l. c., see Fusarium.
2. Shapovalov, Michael. High evaporation: a precursor and a concomitant of western yellow tomato blight. Phytopath. 15: 470-478. Aug. 1925.
3. ------------- Ecological aspects of a pathological problem (western yellow blight of tomatoes). Ecology 6: 241-259. 1925.

MOSAIC, CAUSE UNDETERMINED

Although the amount of mosaic has been increasing during the past few years, most collaborators report less than in 1924.

Table 20. Estimated losses from mosaic as reported by collaborators in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
8	Ohio	1.5	Utah
6	New York	1	Maryland, Kansas
5	Minnesota, New Mexico	0.5	Indiana
2.5	Michigan	Trace	Virginia, Wisconsin
2	California, Iowa		

Collaborators' reports:

Connecticut: One report of considerable injury. (Clinton)

New Jersey: The filiform, streak, and mosaic effects were observed in many fields this year. The disease was very severe in some fields and heavy losses occurred. In one field of Greater Baltimore tomatoes that showed 100 per cent infection in June, close observation was made until the plants were completely defoliated in October. Although severely diseased throughout the growing season, the average production per acre on six acres was between 10 and 14 tons of nearly all first class fruit. This is the only case of this kind reported from this state. (Poole)

Maryland: Very prevalent in some fields, seems to be increasing in severity in the state. (Jehle & Temple)

Virginia: Typical mosaic was common in the Virginia tomato sections during the past season. (McWhorter)

Kentucky: Very slight mosaic this year. (Gardner & Valleau)

Florida: The disease was very severe on the west coast, showing up in 100 per cent of the fields in that section. The early crop suffered little loss but late plantings in several instances were total losses. The fruit that set was malformed. (Weber)

Oklahoma: Causing considerable loss in the west central portion of the state. Fully 20 per cent of the plants in a small field were killed by this disease. (Rolfs)

Ohio: Mosaic has not been as serious this year as last although it has caused some loss in some sections. Less serious in trucking section than last year but somewhat more general in greenhouses. (H. C. Young)

Michigan: Mosaic was destructive in some greenhouses, but out-of-doors was not a factor in production this year. Apparently less than the usual amount in commercial fields. (Nelson)

Wisconsin: Found a few plants in greenhouses at Milwaukee. (Vaughan)

Minnesota: Generally present in usual abundance. (Sect. Plant Path.)

Nebraska: Mosaic very common, varying from a trace to 90 per cent in commercial fields. This is the most serious disease of tomato vines in this state. (Goss)

Kansas: Worst in the western Arkansas Valley around Dodge and Garden City. Causes failure to set. (White)

Utah: Tomato mosaic is found to be especially severe in Davis County. A number of fields show heavy infestation, in some cases up to as much as 75 or 80 per cent. Exact distribution and severity for other parts of the state is at present unknown. (Richards)

Oregon: Apparently this disease is widespread and probably doing some damage. (Barss)

More serious and more abundant in greenhouses here, although occasionally serious in individual fields, as much as 5 to 10 per cent. Some growers believe infection comes from potato plants which were near beds where tomato plants were started. (McKay)

California: Very severe attack of "shoe-string" mosaic noted at Milipitas in October. Few scattering plants elsewhere. (Rosa)

Elmer (3) reports successful inoculation of tomato by transmission by various methods of mosaic virus from bean, celery, sugar cane, *Cucurbita pepo*, *Zinnia elegans*, *Calendula officinalis*, *Abutilon theophrasti*, *Martynia louisiana*, *Asclepias syriaca*, *Nepeta cataria*, and *Nicotiana glutinosa*; and infection of *Cucurbita pepo* by tomato mosaic virus. The symptoms produced on tomato by inoculation from these various hosts were similar to those produced by tomato or tobacco mosaic virus.

Olitsky and Northrop (7) report infection of tomato plants with virus from mosaic potatoes, both tubers and leaves producing a disease identical in appearance with tomato mosaic.

Recent literature:

1. Anon. Virus diseases of plants. Aphides and the tomato and potato mosaics. Fruit Grow. 59: 233-234. Feb. 12, 1925.

2. Dickson, B. T. Tobacco and tomato mosaic. Science n. s. 62: 398. Oct. 30, 1925.
   (2) Streak of tomato in Quebec a "double-virus" disease.

3. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

4. Gardner, M. W. Necrosis, hyperplasia, and adhesions in mosaic tomato fruits. Jour. Agr. Res. 30: 871-888. May 1, 1925.

5. Hansen, A. A. Controlling diseases by destroying weeds. Better Crops 44: 22-23, 28-29. June 1925.
   Eradication of ground cherry and bull nettle to control tomato mosaic.

6. Olitsky, P. Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exper. Med. 41: 129-136. 1925.

7. ----------- and J. H. Northrop. The inoculation of tomato and tobacco plants with potato mosaic virus. Science n. s. 61: 544-545. May 22, 1925.

8. Pritchard, Fred J. Tomato blight. Canning Trade 49(14): 12, 14, 16, 18-20. Nov. 23, 1925.

9. Richards, B. L. l. c. see Fusarium.

10. Schenk, P. J. De mosaiekziekte van de tomaat. Floralia 46: 118. Feb. 20, 1925.

11. Sorokin, Helen. The destruction of the chloroplasts in tomato mosaic. (Abstract) Phytopath. 16: 66-67. Jan. 1926.

STREAK OR WINTER BLIGHT (CAUSE UNDETERMINED)

In New York, loss from streak in greenhouses in 1925 is estimated at 2 to 5 per cent.

New York: Important in many greenhouses, general. Monroe County - Lord Robert variety severely affected. Growers cut off affected tops. Some evidence that it spreads along the row. Chemung County - Considerable number of plants affected. (Chupp)

New Jersey: See mosaic.

Ohio: The streak disease of tomato is becoming more conspicuous each season, being found not only in greenhouse culture, but also in field tomatoes. In many cases this seems to be associated with mosaic symptoms. Decided stunting of the plants and reduction in yield are the most marked symptoms where the disease occurs. (Dept. Plant Path.)

Streak is now regarded, by some investigators in this country and in Canada, as a virus disease. Gardner (3), who has described abnormalities of the fruit produced by plants affected with streak, considers it to be an extremely severe form of mosaic. Dickson (2) calls it a "double-virus disease." He states that from the results of experiments and from observation, ". . . . it may reasonably be concluded that in Quebec streak or stripe of tomato is not a disease caused by B. lathyri but is a disease resulting from double inoculation, i. e., with virus of potato mosaic and tomato mosaic (tobacco mosaic in this case being considered the same as tomato mosaic)."

On the other hand, Stone (4) believes that the disease, as observed in the greenhouse in Ontario, is associated with excess of nitrogen and deficiency of potash and of phosphoric acid in the soil, and states that, "Good results in the control of this disease in commercial greenhouses have been obtained by increasing phosphoric acid and potash content of fertilizers applied under cultivation." However, Bewley (1) apparently attaches no importance to phosphate but lays stress upon the use of potash or the proper balance of nitrogen and potash. He believes that the disease is caused by Bacillus lathyri Manns & Taub.

Recent literature:

1. Bewley, W. Tomato diseases. Jour. Royal Hort. Soc. 47: 169-174. Sept. 1922.

2. Dickson, B. T. Tobacco and tomato mosaic. Science n. s. 62: 398. Oct. 30, 1925.

3. Gardner, M. W. Necrosis, hyperplasia, and adhesions in mosaic tomato fruits. Jour. Agr. Res. 30: 871-888. May 1, 1925.

4. Stone, R. E. Winter blight or streak in tomatoes. (Abstract) Phytopath. 15: 300. May 1925.

COLLAR ROT DUE TO VARIOUS ORGANISMS

Collar rot due to various organisms, mostly undetermined in the particular instances reported, was severe locally in New Jersey, Maryland, Virginia, North Carolina, Mississippi, and Indiana.

New Jersey: This disease was reported in May and June from plant beds in Camden, Burlington, Salem, and Cumberland Counties. It caused a girdling and blackening of the underground stem and dark spots on parts of the stem above ground. The disease was transmitted to the field from the plant beds, and in four fields the losses of plants were 10, 30, 20, and 10 per cent respectively. (Poole).

Maryland: Some collar rot on tomatoes on Eastern Shore. Less than last year. (Jehle, Aug. 3)

Virginia: Very abundant in early spring crop. (McWhorter, Norfolk (Truck) Exp. Sta.)

Alternaria is blamed for much of the stem canker which is prevalent in some fields. (Fromme, Sept. 15)

North Carolina: Reported by Moore as occurring and causing severe injury in one or two places at Maxton, N. C., as a result of seed bed infection. (Ludwig, Sept. 15)

Mississippi: This disease is quite common throughout this section (Raymond, Hinds County), and in some fields will cause a loss of 20 to 25 per cent. (H. H. Wedgworth, letter July 23, transmitting specimen which could not be determined.)

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

As usual this disease is reported only from the southern states. This is a disease which is usually only serious locally. The largest losses are reported from South Carolina and Louisiana.

Table 21. Estimated losses from bacterial wilt as reported by collaborators, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
10	South Carolina	1.	Georgia, Florida
5	Louisiana	0.5	Maryland, Alabama
3	North Carolina	Trace.	Virginia
2	Mississippi		

Collaborators' reports:

North Carolina: Localized, but often producing serious damage in garden plots. (Fant)

South Carolina: Common throughout coastal section. Some fields infected as high as 15 per cent. First noticed in Charleston County, May 13. (Moore)

Florida: Disease generally distributed and as severe as last season, especially on sandy soil in the central portion of the state. (Weber)

Mississippi: Reported in June from Wayne County, where it was causing serious damage locally. Also appeared to be very prevalent in Copiah County about the middle of June. (Neal)

Porto Rico: Common and severe. (Cook & Tucker)

BACTERIAL CANKER (GRAND RAPIDS DISEASE) CAUSED BY APLANOBACTER MICHIGANENSE EFS.

This disease was not reported from any new states in 1925, but its appearance in British Columbia was recorded (2). Five reports of this trouble were received in Connecticut in 1925, all rather serious and it was so bad in two fields that growers plowed them up, according to Clinton. In Massachusetts it was said to be serious in greenhouses. In New York, Chupp reports one field badly affected with a disease having symptoms of the Grand Rapids disease, and a bacterium was found to be present. Anderson (1) reports that a number of tomato growers in southern Illinois who secured plants from Georgia were troubled with the Grand Rapids disease. In his opinion the disease was evidently introduced on the imported plants, since in several fields as high as 10 per cent of the Georgia plants were affected, while home-grown plants nearby showed no indication. No direct reports of the presence of the Grand Rapids disease in Georgia have been received by the Plant Disease Survey office. This emphasizes the necessity for a more careful survey of southern states for the presence of this disease which is not well known and is sometimes confused with other tomato wilts.

The symptoms of the Grand Rapids disease are well described by Miss Bryan (Pl. Dis. Rep. 8: June 15, 1924) as follows:

> "This disease is characterized in early stages by a one-sided wilting of leaves, leaflets on one side being perfectly turgid while those on the other are flaccid or even dried up. Later, pale streaks may appear along the line of infection on stems, which often crack open along this line. The interior of the stem in early stages shows whitish spots in the region of the vascular ring, but in later stages there is a yellow or yellow-brown discoloration, not so dark as with Bacterium solanacearum. Often the whole pith and cortex is involved with distinct cavities, especially on the upper tender parts. In the more advanced stages the whole plant is wilted. It is a much slower acting disease than the wilt caused by Bacterium solanacearum."

Recent literature:

1. Anderson, H. W. A serious bacterial disease of tomatoes in southern Illinois. Ill. State Hort. Soc. News Letter 6: Aug. 10, 1925.

2. McLarity, H. R., and T. M. C. Taylor. A bacterial disease of tomatoes new to British Columbia. (Abstract) Phytopath. 15: 302. May 1925.

BACTERIAL SPOT CAUSED BY BACTERIUM VESICATORIUM DOIDGE
(Bacterium exitiosum Gardner & Kendrick)

In previous years bacterial spot has been reported from Pennsylvania, Tennessee, Georgia, Florida, Indiana, Illinois, Michigan, Iowa, and Kansas. The disease was recorded from several new states in 1925, including New York (verified by Gardner), Kentucky, Louisiana, Nebraska, and Missouri. In most of these it was found in only one field, but in Nebraska, according to Goss, it was common and severe and caused considerable loss.

Since 1922, when it was first described, bacterial spot has been reported each year as causing more damage than previously in Indiana, and 1925 was no exception to this rule. Gardner stated that, "Owing to spring freezes more southern grown plants than usual were used in Indiana this year and to this is attributed the increased prevalence of this disease." On the other hand, Nelson reported that in Michigan, "Bacterial spot was not noted this year. It never has assumed commercial importance in the state, usually being found only locally", and White reported it as of very slight importance, as usual, in Kansas.

Since many tomato plants are now being grown in the South for use in northern states it would be desirable to know what and how serious the diseases are that are occurring in the southern plant beds.

NEW BACTERIAL DISEASES

Two new bacterial diseases have been reported during 1925.

A bacterial rot of tomato fruits, occurring in Nebraska and Texas, is described by Miss Brown (1). The organism causing it has not yet been named.

A bacterial vascular wilt, due to an organism which, according to Dr. Erwin F. Smith's office in the Bureau of Plant Industry, is unlike any hitherto associated with a tomato disease, was reported from Oregon by Barss, as follows:

> "A bacterial systemic vascular wilt of tomato has appeared with severe effects in a few gardens and one truck farm near Corvallis. So far the trouble is all traceable to one lot of seedling tomatoes but further study of distribution and occurrence is needed. The bacteria are actively motile, which excludes Aplanobacter michiganense. Bacillus solanacearum is not supposed to be present in the arid or semi-arid Northwest. Nothing like this has been seen in Oregon before as far as we know."

Recent literature:

1. Brown, Nellie A. A new bacterial disease of tomato fruits. Science n. s. 62: 12-13. July 3, 1925.

BLOSSOM-END ROT, NON-PARASITIC

In states where tomatoes were planted early, and fruited before the drought was broken by fall rains, blossom-end rot was reported to be more severe than usual, whereas, in states where tomatoes were planted later, and fruited after the drought had been broken, blossom-end rot was less severe, or at least no worse, than usual.

Table 22. Estimated average percentage loss from and relative prevalence of blossom-end rot in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
Ga.	10	More	Same	Calif.	1	--	--
Ark.	10	More	More	N. Dak.	0.5	Less	Less
N. C.	8	More	Same	Mich.	Trace	Less	Same
Va.	4	More	More	Wis.	Trace	Less	Less
N. Mex.	4	More	More	Minn.	Trace	Less	Less
Md.	3	Less	Same	Iowa	Trace	Less	--
W. Va.	2	More	More	Mass.	-	Same	Same
N. Y.	1.5	--	--	La.	-	Same	Same
Ala.	1.5	More	More	Ohio	-	Same	Same
Texas	1	--	--	S. Dak.	-	Same	--
Kans.	1	Same	Same	Utah	-	Same	--
Ariz.	1	--	--	Oregon	-	More	--

Collaborators' reports:

New Jersey: This disease was just as severe as usual in greenhouses and caused much loss in isolated areas. (Poole)

Virginia: Blossom-end rot followed by a large-spored Macrosporium was the most severe fruit trouble during the summer. In a few places it ruined the early crop. (McWhorter)

More general and severe than I have ever seen it, 50 to 60 percent of affected fruits not uncommon. Aside from this and Fusarium wilt the tomato crop is exceptionally free from disease. (Fromme)

Georgia (southern): A high percentage (probably 15 per cent) of first settings affected due to rainy weather following the protracted drought of April and May. Subsequent settings of fruit practically free. (Boyd)

Alabama: Blossom-end rot of tomato is the worst in this section that many growers have ever experienced. This disease, together with the ravages of the tomato fruit worm, Heliothis obsoleta, has seriously reduced yields. The season has also been abnormally dry. It is a common observation that blossom-end rot is much more serious on fields which are not watered than on irrigated fields. (N. F. Howard)

Quite severe in experimental plots on College Farm. Increase was due, no doubt, to the severe, dry weather during the summer. (Miles & Blain)

Mississippi: Prevalent and serious everywhere this season because of dry weather. (Neal)

Texas: Very prevalent in east Texas, 3 per cent loss. (Taubenhaus)

Arkansas: All over state. Dry weather appears to have had serious effect. (Dept. Plant Path.)

Indiana: Rather serious. Occurs on first fruit set. More serious in gardens and greenhouses than in the canning crop. (Gardner)

Michigan: Tomatoes were planted very late and the drought was broken by the time commercial set of fruit was in susceptible condition. (Nelson)

Idaho: Very important. Usually associated with lack of water. (Hungerford)

Oregon: Very abundant this year due to excessively hot and dry atmospheric conditions prevailing early and later in the season. (Barss)

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL.
(Caconema radicicola (Greef) Cobb)

The rootknot disease of tomatoes was reported to be severe in 1925 in southern Georgia, Florida, Arkansas, and in southern California and the San Joaquin Valley. In south Georgia the estimated loss in yield is 8 per cent, in California 5 per cent, and in New Mexico 3 per cent. Other states reporting rootknot outside of greenhouses are Maryland, South Carolina, Texas, Oklahoma, and Kansas. In Virginia, Ohio, South Carolina, and Maryland it was reported in greenhouses.

Tomato survey for rootknot in Maryland - R. A. Jehle and C. E. Temple.

Tomato plants from the South have been brought into Maryland for a number of years, but they have only been introduced in very large numbers during the past two years. In the spring of 1925 several million plants were shipped in, most of them coming from Georgia. Tomato growers had been warned by the pathologists of the state that they were taking a great risk of infecting their land with nematodes and other disease producing organisms when they brought in those plants. In order to ascertain whether nematodes were actually being brought in with the imported plants a thorough survey was made in the three Eastern Shore counties, Dorchester, Caroline, and Talbot, into which most of the plants were brought. The first search for rootknot was made immediately before picking season and a severely infested field set from Georgia plants was found. Further inspections were made about mid-picking season but no new cases were found. The most complete survey was made at the end of the picking season, when large numbers of plants could be pulled up and examined without causing losses to the growers. This inspection was made thoroughly, at least a hundred plants being pulled up in each field, and often as many as five hundred. Sixteen fields set from Georgia plants and eleven set from home-grown plants were inspected. The most important result of this survey was the finding of rootknot in every field set from Georgia plants, and in a few fields of home-grown plants which had been associated with or grown adjacent to Georgia plants. The amount of rootknot found varied from a trace to 100 per cent infected plants but the loss in yield was slight in most cases. However, in one field the disease was so severe that the loss was estimated by the owner as 50 per cent of the crop. Rootknot has been found before in the state on several other crops but has been relatively unimportant in the field heretofore.

Table 23. Results of survey for rootknot of tomatoes in Maryland, 1925.

County	Number of farms surveyed	Approximate number of plants examined					
		Georgia-grown			Home-grown		
		Total	Free	Infected	Total	Free	Infected
Caroline	8	847	770	77	455	349	6
Dorchester	8	991	428	563	270	268	2
Talbot	3	327	201	126	156	156	0
Total	19[1]	2165	1399	766	881	773	8[2]

1. Home-grown and Georgia-grown were both inspected on nine farms. Home-grown only on two farms, and Georgia-grown only on seven farms.

2. All may have been infected from Georgia plants through puddling with or growing adjacent to, Georgia plants.

LEAFMOLD CAUSED BY CLADOSPORIUM FULVUM CKE.

In 1925 leafmold was reported to be the cause of serious injury to tomatoes in the greenhouse in Massachusetts, New York (estimated reduction in yield 10 per cent), Ohio, Indiana, and Washington. It was also reported to be present although not serious, in greenhouses in Michigan and Wisconsin. McWhorter states that in Virginia some field plantings were seriously injured by leafmold, Bonny Best being very susceptible. In Florida, according to Weber, it was most severe on the west coast,being about the same as last year.

Gardner, in a recent article (1), described a "conspicuous, black, stem-end rot of both immature and ripe greenhouse tomatoes" occurring in epiphytotic form in a fall crop of Bonny Best tomatoes at Lafayette, Indiana, in 1923, and found to be due to _Cladosporium fulvum_, which "also causes blackened radial furrows in the fruit, and lopsided fruits which tend to remain green or yellow on the retarded side." Infection occurs apparently "rather early through stomata in the sepals, torus, or last pedicel internode, after which the mycelium grows down into the fruit." The fungus also "invades the seed both externally and internally", and cotyledon infection of germinating seedlings may occur from both infected and surface-contaminated seed. The temperature range for growth and spore germination of the fungus was found to be from 10° to 30°, and the optimum at 20° to 25° C.

Recent literature:

1. Gardner, Max W. Cladosporium leaf mold of tomato: fruit invasion and seed transmission. Jour. Agr. Res. 31: 519-540. Sept. 15, 1925.

2. Hasper, E. Biologie und Bekämpfung des Cladosporium fulvum Cooke auf Solanum lycopersicum. (Biology and control of Cladosporium fulvum Cke. on Solanum lycopersicum.) Zeitschr. Pflanzenkrankh. 35: 112-118. 1925.

ANTHRACNOSE CAUSED BY COLLETOTRICHUM PHOMOIDES (SACC.) CHEST.

The following reports of anthracnose were received in 1925:

New York: One farmer sends specimens and says that nearly the whole crop was lost because of this disease. (Chupp)

New Jersey: This disease was much less severe than usual. In September and October slight losses occurred in the canhouse crop in Burlington County. (Poole)

Florida: Commonly found causing fruit rot. (Weber)

Indiana: Caused considerable loss to canners, one of whom found it responsible for an objectionable increase in mold counts in the pulp. (Gardner)

FRUIT ROT AND DAMPING-OFF CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Total destruction of plants in a hotbed at Phillipsburg, Kansas, due to damping-off caused by Rhizoctonia, was reported by White. Rhizoctonia caused damping-off in Connecticut and New York, also. Bisby reported from Manitoba that some young plants were killed by Rhizoctonia dry stem rot.

Soil rot was reported from Texas and Indiana. It was worse than usual in central Indiana, according to Gardner, who stated that it was serious locally and was apparently most severe in soil where tomatoes had been grown during the previous year. It develops into a core rot which is very objectionable to the canners. The white Corticium stage appeared on the surface of the fruit.

DISEASES CAUSED BY PHYTOPHTHORA SPP.

Buckeye rot caused by Phytophthora terrestris Sherb. was common but not so important as in 1924 in Florida on tomatoes that were not staked, according to Weber. Norton reported it from Maryland as severe in one field near Washington. Gardner stated that it was noted in Indiana in market gardens in the vicinity of Indianapolis.

Canker caused by "Reddick's Phytophthora" was reported from New York by Chupp as "still present in the University greenhouses and a few neighboring gardens."

Leonian (1) includes both P. terrestris and "Reddick's Phytophthora", as well as several other species, in P. omnivora D By.

Recent literature:

1. Leonian, Leon H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

2. Tryon, H. Tomato blight disease (Phytophthora infestans). Queensland Agr. Jour. 24: 239-242. Sept. 1925.

OTHER DISEASES

Verticillium alboatrum Reinke & Berth. Verticillium wilt was reported by Milbrath to be present in all parts of California, causing a loss estimated at one-half per cent. An occasional infection occurred in Ohio, according to Young.

Miss Bryan (1) found that Verticillium wilt occurred to a considerable extent in 1924 in tomato fields in northern Ohio and in Erie County, Pennsylvania, in combination with both Fusarium wilt and Grand Rapids disease. She states that "The demonstration of Verticillium wilt where Fusarium was supposed to be causing the trouble suggests that perhaps this fungus is doing damage in other places in northern tomato fields where cool temperatures would favor its ravages and retard Fusarium."

Pythium sp. causing damping-off was reported by Fenner to cause slight losses in Beaufort and Oconee Counties, South Carolina.

Damping-off caused by various organisms was important in New York, according to Chupp, who stated that, "If Rhizoctonia was not present, very good results were obtained with copper applied to the soil."

Sclerotium rolfsii Sacc. causing stem rot was of minor importance in southern Georgia, although it was common in the Coastal Plain. It caused a loss estimated by Boyd at 2 per cent. In two fields it was very common and destructive following rootknot injury. The fungus also caused a fruit rot in southern Georgia, which was not important. In South Carolina the stem rot was said by Fenner to be a limiting factor in the coastal area in some cases. Moore reported that "This trouble was found in 75 per cent of the fields of Beaufort County this season. Infection ran from a trace to as high as 25 per cent. Most cases seem to be soil infections, the stems rotting off at the ground line about the time of maturity of the first crop of fruit." (July 15). The disease was reported from Mississippi also.

Oospora lactis parasitica Pritchard & Porte, fruit rot. Destructive in some sections of Burlington County, New Jersey, where severe hail injury occurred during the summer, according to Poole.

Phoma destructiva Plow., fruit rot. Weber reported from Florida, "Fruit rot caused by this fungus was very important in transit. There was very little evidence of such damage in the field. It also caused a serious leafspot which was more common than last year." The disease was present in New York also.

Rhizopus nigricans Ehr. Milbrath reported that fruit rot due to Rhizopus caused a loss estimated by him at one-half per cent, in field and transit, in California.

Sclerotinia sclerotiorum (Lib.) Mass., watery rot (4). Reported by Weber to be serious where it occurred, but not common, in Florida.

Blossom drop, cause unknown. Collaborators in Texas and Kansas estimated the loss in yield due to blossom drop at one per cent, and the trouble was reported from Washington also. White states that in Kansas,

> "Blossom drop of tomatoes was severe this season on our experimental plots at Manhattan on plants staked and pruned to a single stem. It is of interest to note that a high percentage of those blossoms in bloom during an unprecedented period of cool weather, the last of July and the first of August, (coldest night July 31, 49° F.) all dropped. No difference could be noted between the many varieties and hybrids which were being grown. All seemed very susceptible to the sudden drop in temperature."

A die back or tip blight, the cause of which has not yet been determined, was observed by Shapovalov in tomato fields in the trucking sections of Los Angeles County, north of San Pedro, California. He says that some patches were totally ruined and were plowed up.

Hollow stem, due to excess of nitrogenous fertilizers, or to mixed fertilizers placed directly in contact with the roots, was reported from Arkansas.

Leafroll was reported by Weber to be important on staked tomatoes on the west coast of Florida.

Puffiness of the fruit (non-par.) caused losses estimated at one-half per cent in Texas and 2 per cent in California.

Wilting due to proximity to walnut trees was reported from Michigan by Nelson. Massey (3) describes a similar wilt of tomatoes and other plants, observed in Virginia, and concludes that it is due to a substance found in the bark of the walnut roots which is toxic to the plants affected.

Recent literature:

1. Bryan, Mary K. Verticillium wilt of tomato. Phytopath. 15: 187-188. March 1925.

2. Butcher, R. W. A bacterial rot of the tomato stem. Ann. Rept. Exp. & Res. Sta. Nursery & Mark. Gard. Devel. Soc. 10: 73-74. 1925.
   Rotting at base of stem due to *Bacillus carotovorus*.

3. Massey, A. B. Antagonism of the walnut (Juglans nigra L. and J. cinerea L.) in certain plant associations. Phytopath. 15: 773-784. Dec. 1925.

4. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

DISEASES OF SWEET POTATO

STEMROT CAUSED BY FUSARIUM BATATATIS WOLL. AND F. HYPEROXYSPORUM WOLL.

In the majority of the sweet potato growing states stemrot was reported to be more prevalent than usual in 1925.

Table 24. Relative prevalence of and estimated percentage loss due to stemrot in 1925.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
N. J.	30	More	More	Calif.	2	--	--
Del.	10	More	More	N. C.	1	--	--
Iowa	10	Less	--	Ind.	1	--	--
Va.	5	--	--	Ariz.	0.5	--	--
Md.	4	Same	Same	S. C.	Trace	More	More
Ala.	3	Same	Same	La.	Trace	--	--
Ga.	2	More	--	Ky.	Trace	--	--
Ark.	2	More	More	Fla.		Less	--
Kans.	2	Less	Less				

The severity of stemrot in certain states can be judged from the following reports from collaborators:

New Jersey: The loss from stemrot this year was the greatest that has occurred in this state during the past five years. The large percentage of infection occurred early in July during an extremely hot drouth period. (Poole)

Delaware: Very heavy infection this season. The initial stand out 5 to 20 per cent in some fields. Weather very favorable for wilt during June and July. (Adams)

Virginia: The most severe infections noted for several years. In some cases 30 per cent of the crop destroyed. The disease was of greatest economic importance this season. (McWhorter)

Alabama: Quite important. General in coast counties and scattered throughout rest of state. Inspection by State Department of Agriculture is slowly lessening the disease. (Miles & Blain)

Arkansas: Common, especially in southern and central part of state, and causing much damage in some localities. (V. H. Young)

Indiana: This is the only serious field disease of this crop in the state. (Gardner & Kendrick)

The following statements were made concerning varietal susceptibility:

New Jersey: The Red Brazil, Yellow Yam and White Yam varieties, which in other years had not been attacked by the disease, were very slightly infected this year. (Poole)

North Carolina: Fant reports that a field of Nancy Hall sweet potatoes near Henderson were infected to the extent of about 50 per cent.

Georgia: Common in Porto Rico, Nancy Hall, and Big Stem Jersey. (Boyd)

Arkansas: Nancy Hall very susceptible, Porto Rico less than Nancy Hall. (Dept. Plant Path.)

Collaborators in Mississippi and Kansas report that the losses from stemrot are gradually being reduced by the use of certified or hill selected seed combined with rotation and seed bed sanitation. Poole (3) reports satisfactory control of stemrot in infested soil by planting two or three plants per hill instead of only one. He states that an almost perfect stand was maintained on soils where 50 per cent of single plants in check plots were killed and that the yield was increased even when plots containing single plants per hill were only slightly affected. This method is said to be less expensive than replanting.

Recent literature:

1. Poole, R. F. Sweet potato varieties that produce well and are resistant to stem rot on sassafras sands. Phytopath. 15. 48. 1925.

2. ----------- Fertilizer injuries to sweet potatoes. Some substances aid the destructive stemrot organism. New Jersey Agr. 7 (9): 7-8. Sept. 1925.

3. ----------- Making sweet potato growing safer. Ravages of stem rot reduced by simple method. New Jersey Agr. 7 (12): 2-3. Dec. 1925.

BLACKROT CAUSED BY CERATOSTOMELLA FIMBRIATA (ELL. & HALS.) ELLIOTT (SPHAERONEMA FIMBRIATUM (ELL. & HALS.) SACC.)

Sweet potato blackrot seems to be decreasing in severity due to more general employment of control measures such as the use of certified seed and sprouts, seed treatment, seed selection, and seed bed sanitation. The effect of the application of these practices upon the prevalence of blackrot in the various states is indicated by the following statements from collaborators and the accompanying table (table 25) and graph (figure 1).

Table 25. Percentage reduction in yield due to blackrot for the years 1919 to 1925.

State	Percentage reduction in yield						
	1919	1920	1921	1922	1923	1924	1925
New Jersey	15	16	2	2	2	0.2	0.2
Delaware	6	6	1	0.5	0.5	0.5	0.5
Maryland	5	5	1	1	1	1	2
Virginia	5	2	5	5	3	3	1
North Carolina	10	10	6	--	3	3	2
South Carolina	7	--	0.5	0.5	5	0.5	2
Georgia	12	5	7	2	1	2	1
Florida	2	--	--	--	Trace	--	Trace
Ohio	2	--	--	--	--	--	--
Indiana	Trace	Trace	1	Trace	1	--	Trace
Illinois	2	1	--	--	0.5	--	--
Iowa	2	--	5	5	9	9	5
Missouri	1	--	--	--	Trace	--	--
Kansas	8	5	3	2	1.5	0.5	0.5
Kentucky	--	--	--	15	15	--	5
Tennessee	10	10	8	10	3	8	--
Alabama	1	5	--	--	2	1	3.5
Mississippi	5	10	15	5	2	2	2
Louisiana	1	4	3	1	1	1	1
Texas	2	5	5	3	10	8	5
Oklahoma	2	2	--	--	--	5	4
Arkansas	1	2	5	1	2	5	4
New Mexico	5	--	--	--	2	--	Trace
Arizona	--	--	--	Trace	--	1	2
California	2	2	--	--	--	--	2
United States	5.64	5.4	5.4	3.4	3.2	2.75	1.8

New Jersey: This disease is nearly under control in this state. The selection of disease-free seed and the use of sanitary plant beds have completely eliminated the disease in many cases. In spite of the use of healthy seed stock, there is sometimes slight infection from some soils. The disease is also sometimes found in storage bins and several severe losses were reported. The use of the bushel hamper has done much to confine this disease to individual baskets, thereby protecting much of the crop that would have been affected had the potatoes been stored in bins. (Poole)

Mississippi: Becoming less serious as a result of the work of the State Plant Board in inspecting all slips entering the state, and the destruction of all infected lots. Many growers of certified slips are also helping to reduce the disease. (Beal)

Arkansas: Seed certification helping to reduce losses materially. (Dept. Plant Path.)

Kansas: Seed treatment, hill selection for seed, and sanitary storage and bedding have about eliminated this disease. (White)

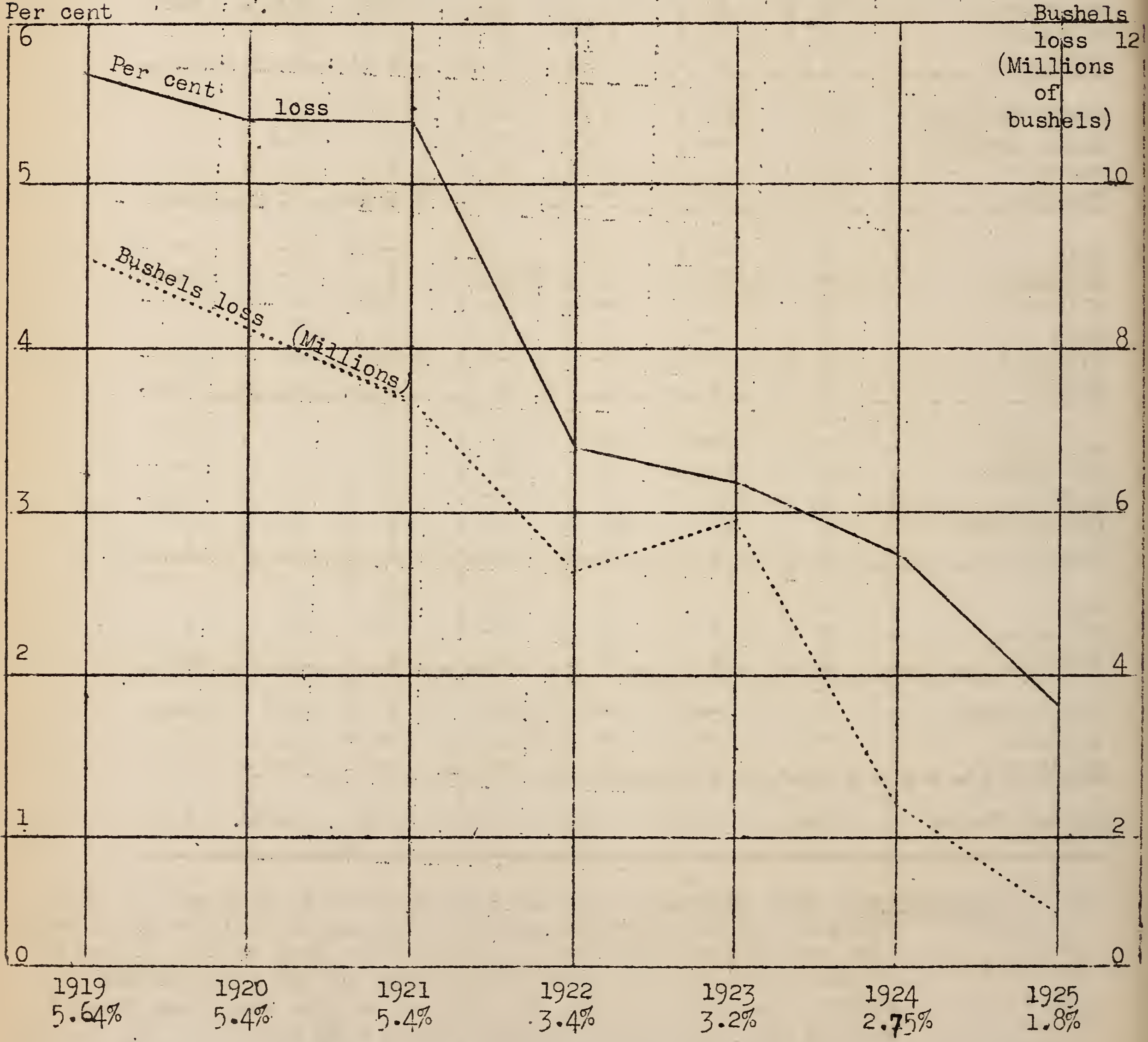

Figure 1. Graph showing decrease in loss from blackrot for the years 1919 to 1925 inclusive.

Recent literature:

1. Elliott, John A. A cytological study of Ceratostomella fimbriata (E. & H.) Elliott. Phytopath. 15: 417-422. July 1925.

SOIL ROT CAUSED BY CYSTOSPORA BATATA (ELL. & HALS.) ELLIOTT

The most severe injury from soil rot in 1925 was reported by Poole in New Jersey where the loss was estimated at 5 per cent. He states that

> "This disease was more severe than during the previous five years. It occurred on 80 per cent of the farms this year in comparison with only 10 per cent last year. Some of the oldest growers claim that it had not been seen on their farms previous to this season. In many fields the infection was so slight as to be negligible, while in others the crop was a complete failure. On soils where alfalfa was used in rotation and the soil heavily limed, the losses were extremely heavy."

A 2 per cent loss was reported from Arkansas; one per cent from Delaware; one-half per cent from Maryland; and a trace from Virginia, Kansas, Mississippi, Georgia, Louisiana, Oklahoma, and California.

Manns and Adams (1) have continued their investigations on the cause of soil rot. They found that by using bacteriological methods of staining, a fungus having morphological characters similar to Actinomyces, was consistently found in all pox lesions. This substantiates their conclusion that the disease is probably not due to Cystospora batata but rather to an undetermined Actinomycete.

Recent literature:

1. Manns, T. F., and J. F. Adams. Report of department of plant pathology and soil bacteriology. Delaware Agr. Exp Sta. Bul. 139: 24-29. 1925.

2. Poole, R. F. The relation of soil moisture to the pox or ground rot disease of sweet potatoes. Phytopath. 15: 287-293. 1925.

SCURF CAUSED BY MONILOCHAETES INFUSCANS ELL. & HALS.

Scurf does not affect the quality of the sweet potato unless it is attacked severely, when shrinkage may result. However, its presence impairs the appearance of the potatoes greatly. The losses from this disease depend largely upon market conditions, scurfy potatoes being discriminated against more severely when the supply is large than when it is small. Streets estimat the loss in Arizona at 2 per cent; otherwise only slight losses occurred in 1925, Maryland and South Carolina each reporting one-half per cent and New Jersey, Georgia, Florida, Arkansas, Indiana, and Kansas a trace.

New Jersey: The disease was present in many fields this year, but the percentage of infection was much less than during any of the preceding years. In many fields the stem of the plant was infected without the potatoes becoming infected. Recent results with disinfectants indicate that one should not rely upon seed treatment to destroy the fungus on infected potatoes, but should select for seed purposes only healthy stock. (Poole)

Recent literature:

1. Poole, R. F. Sulfur effective on scurf. New Jersey Agr. 7(4): 4. April 1925.

2. ------------- Soil stain of sweet potatoes. Care in harvesting reduces losses. New Jersey Agr. 7 (10): 11. Oct. 1925.

STORAGE ROTS

Rhizopus nigricans Ehr. is the most common and destructive cause of storage rot, but other organisms such as Diplodia tubericola (Ell. & Ev.) Taub. (Java black rot), Fusarium oxysporum Schl. (surface rot), and Ceratostomella fimbriata (Ell. & Hals.) Elliott (blackrot) are also responsible for much loss. (See also under other diseases).

Table 26. Losses from sweet potato storage rots in 1925, as estimated by collaborators.

Percentage loss	States reporting	Percentage loss	States reporting
30	Kentucky	8	Maryland, Florida
15	Georgia, Arkansas	6	North Carolina
11	Mississippi	5	Virginia, Iowa, Alabama
10	South Carolina, Texas, Arizona	3	Kansas
		Trace	California

Since a large part of the sweet potato crop is placed in storage each year after harvest, the prevention of storage rots is a very important problem. Formerly most of the crop was stored out-of-doors in banks. A few growers were very successful with this method and seldom lost much of the stored crop, but in most cases it proved to be a very hazardous practice and often many, and sometimes all, of the potatoes stored in banks were lost. This fact led to increased use of storage houses. Although decay was at first not very well controlled even in the houses, losses there were not so large as in banks. Investigation by federal and state plant pathologists and horticulturists of the problems of construction and management of storage houses and of the proper handling of the crop prior to storage led to improvements in methods which were demonstrated to the growers by federal and state extension workers and other agencies, especially during the war period and since, and which have resulted throughout the country in a great

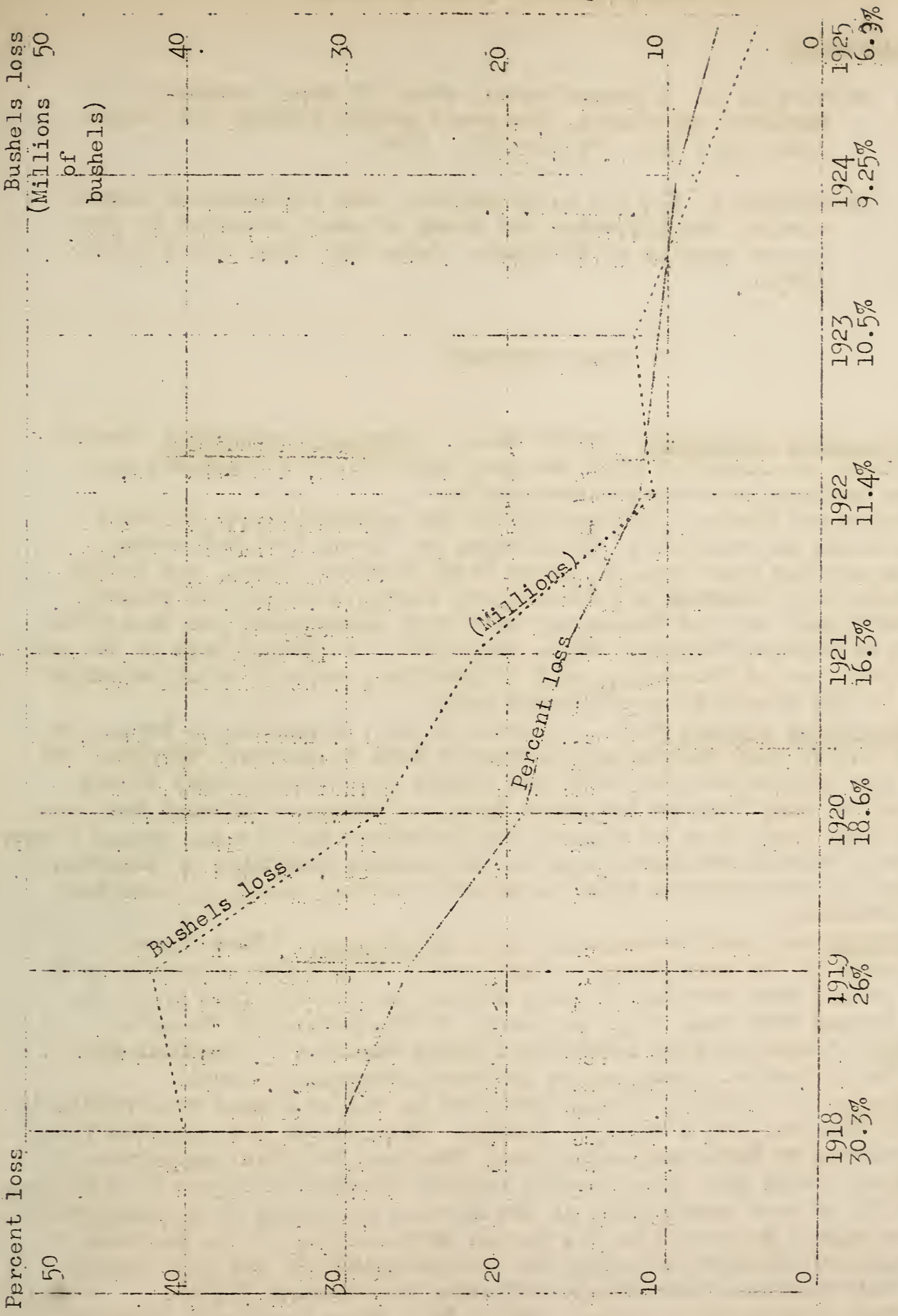

Figure 2. Graph showing losses from sweet potato storage rots in the United States from 1918 to 1925 inclusive.

decrease in the losses from sweet potato storage rots. This reduction is very well illustrated by the accompanying graph (figure 2), which shows the estimated losses from storage rots in the United States during the past eight years.

Recent literature:

1. Harter, L. L. A physiological study of Mucor racemosus and Diplodia tubericola, two sweet potato storage rot fungi. Jour. Agr. Res. 30: 961-969. 1925.

2. Lauritzen, J. I., and L. L. Harter. The influence of temperature on the infection and decay of sweet potatoes by different species of Rhizopus. Jour. Agr. Res. 30: 793-810. 1925.

OTHER DISEASES

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) rootknot, was reported from Georgia, Oklahoma, and Arkansas, said to be often serious in the last-named state.

Weimer and Harter (7) investigated the susceptibility of sweet potato varieties to nematode in California, and found that Red Jersey, Little Stem and Big Stem Jerseys, Porto Rico, Southern Queen, and Yellow Belmont varieties, although not immune, are highly resistant to attack, whereas Nancy Hall and Red Brazil are both very susceptible and should not be planted on nematode-infested soil, since there is danger both of not obtaining a crop and of increasing soil infestation, as well as of carrying nematodes on the plants into uninfested soil.

Sclerotium rolfsii Sacc., southern blight, according to Boyd, was very important in many manured and irrigated beds in southern Georgia. He estimated the loss at one per cent, and stated that the greatest injury occurred in low damp beds or irrigated beds, and where artificial heat was supplied either from steam or manure. In Louisiana the disease caused a rotting of the plants in the beds early in the season, according to Edgerton. Young stated it was reported twice as causing serious damage in localized areas in Arkansas.

Pythium sp., mottle-necrosis (1). New Jersey, "This disease was observed again in the same areas as last year. It was not so severe as in 1924, but losses were observed in many fields, and in low flat areas the infection ranged from none to 30 per cent of the potatoes" (Poole). Mississippi, "Reported from Lowndes and Jones Counties. Diagnosis confirmed by L. L. Harter. Loss severe in both instances." (Neal)

Mosaic (? - Undet.) Losses reported as due to mosaic were one-tenth per cent in Arkansas and a trace in Kansas. The disease was reported from southern Georgia by Boyd, who stated that this was the first appearance in that section. Nancy Hall was the only variety observed affected in Arkansas, and seemed to be most susceptible in New Mexico, according to collaborators.

Two papers presented at the Kansas City meeting of the American Phytopathological Society discussed the transmissibility and true mosaic nature of this disease, with widely differing conclusions (4, 6).

Albugo ipomoeae-panduranae (Schw.) Sw., white rust, was reported from New Jersey, Delaware, Maryland, Virginia, Illinois, and Porto Rico. In New Jersey, according to Poole, "The disease was worse on the Jersey strains than on the so-called Yam sweet potato varieties in a field where varieties are being compared. Most of the so-called Yam varieties were not attacked."

Septoria batatiçola Taub., leafspot, New Jersey, Delaware, Virginia, Kansas; not important although common in some cases.

Phyllosticta batatas (Thüm.) Cke., leafspot, reported from southern Georgia, Florida, and Louisiana.

Cercospora sp., leafspot. Porto Rico.

Ozonium omnivorum Shear (Hydnum omnivorum Shear), rootrot. Losses reported as due to the Ozonium rootrot were 3 per cent in Arizona and 2 per cent in Texas. The disease also caused considerable injury on the sandy land in the southern part of Oklahoma, according to Rolfs.

Corticium vagum Berk. & Curt., stem rot. Georgia, unimportant.

Macrosporium sp., footrot. Taubenhaus (5) reports a new footrot of sweet potato, which he states he has found in Delaware and in Texas.

Plenodomus destruens Harter, footrot. Maryland, Tennessee, South Carolina, Kansas.

Sclerotinia minor Jagger, reported by Poole to have caused slight damping-off of sprouts in one bed near Vineland, New Jersey.

Rhizopus spp., rot, reported from Delaware, Virginia, South Carolina, Florida, Indiana, Texas, Iowa, New Mexico, and Washington. Traces were observed in the field in Indiana, according to Kendrick. (See also storage rots)

Diaporthe batatatis (Ell. & Hals.) Harter & Fields, dry rot. Boyd reported from southern Georgia, "Of very little importance except in a few plant beds, caused a loss estimated at one-half per cent. Mostly draw stem rot, but also caused lesions on runners, and storage rot. Most destructive in hotbeds irrigated frequently. Big Stem Jersey apparently most susceptible in beds, field, and storage."

Sclerotium bataticola Taub., charcoal rot. Texas, Kansas; of slight importance in both cases.

Diplodia tubericola (Ell. & Ev.) Taub., Java black rot, was reported from South Carolina, Florida, and Porto Rico. In Florida it was said by Weber to be common and destructive. (See also storage rots).

Bacterial softrot, following heavy rain and excessive steam heat under beds, was local and unimportant in South Carolina, according to Fenner.

Recent literature:

1. Harter, L. L. Mottle necrosis of sweet potatoes. (Abstract) Phytopath. 15: 45. 1925.

2. ------------ A physiological study of Mucor racemosus and Diplodia tubericola - two sweet potato storage rot fungi. Jour. Agr. Res. 30: 961-969. May 1925.

3. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-630. Oct. 1, 1925.

4. Rosen, H. R. Sweet potato mosaic and its incubation period of two growing seasons. (Abstract). Phytopath. 16: 74. Jan. 1926.

5. Taubenhaus, J. J. A new foot rot of the sweet potato. Phytopath. 15. 238-240. 1925.

6. Weimer, J. L. Further evidence of the non-transmissibility of the so-called sweet potato mosaic. (Abstract). Phytopath. 16: 74. Jan. 1926.

7. Weimer, J. L. and L. L. Harter. Varietal resistance of sweet potatoes to nematodes, Heterodera radicicola (Greef) Muell., in California. Phytopath. 15: 423-426. 1925.

DISEASES OF BEAN

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LINDEMUTHIANUM (SACC. & MAGN.) BRIOSI & CAV.

The losses from anthracnose in 1925 were reported by most states to be less than last year and less than average. The largest losses reported were from New Mexico, Maine, and New York. No other states reported losses of over one and one-half per cent. No reports of the presence of the disease were received from states west of New Mexico.

Table 27. Estimated average percentage loss from and relative prevalence of anthracnose in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
N. Mex.	6	More	More	Mass.	Trace	Less	--
Me.	5	--	--	Del.	Trace	--	--
N. Y.	4	More	--	S. C.	Trace	--	--
Md.	1.5	--	--	Ga.	Trace	Less	Less
Ala.	1.5	Same	Same	Ark.	Trace	Less	Same
La.	1.5	Less	Less	Mich.	Trace	Less	Less
Ohio	1.5	Same	Less	Minn.	Trace	Same	More
N. H.	1	Same	Same	Iowa	Trace	Same	--
Va.	1	Less	--	Kans.	Trace	Same	Same
W. Va.	1	Less	Less	N. Dak.	Trace	Less	Less
Fla.	1	More	--	N. J.	-	Less	Less
Wis.	1	Less	Less	Ind.	-	Same	--
Conn.	0.5	More	Same				

The following are some of the statements from collaborators regarding the disease.

Massachusetts: Less than usual. But few cases reported. (Osmun & Davis)

New York: Allegany County - Found only in White Kidney bean field. Genesee & Wyoming Counties - In many fields and is doing considerable damage, especially on Marrows, but also on Yellow Eyes. No pea bean fields seen. (Barrus)

West Virginia: Much less than usual. No doubt due to very general dry weather. (Sherwood)

Kentucky: Present but not important. (Gardner & Valleau)

Georgia (southern): Reported from only one place, the trucking section around Savannah, on snap and butter beans. Fields decidedly low and wet with ditch draining. Humidity high, temperature cool. (Boyd)

Florida: Wherever beans are grown this disease is present but the damage is moderate. It was worse this year than last. (Weber)

Alabama: Unimportant. Dry weather of past summer stopped development. (Miles & Blain)

Michigan: Dry weather was very unfavorable for anthracnose. Although considerable damage occurred due to late rains, and localized areas were generally infected, the disease was generally inconspicuous and unimportant. (Nelson)

Wisconsin: Wardwell Wax was the only variety seriously affected. (Vaughan)

North Dakota: Not common. Nearly all gardens planted with resistant seed. (Brentzel)

New Mexico: Considerable. No attempt made by growers to select healthy seed. (Crawford)

Recent literature:

1. Schaffnit, E., and K. Böning. Die Brennfleckenkrankheit der Bohnen, eine monographische Studie auf biologischer Grundlage. Centralbl. Bakt. Abt. II, 63: 176-254, 360-438, 481-508. 1925.

BACTERIAL BLIGHT CAUSED BY BACTERIUM PHASEOLI EFS.

In 1925 the largest losses from bean blight were reported from New York, Louisiana, Indiana, and Iowa.

Collaborators' statements concerning prevalence of blight and varietal susceptibility are as follows:

New York: Destroying large patches, chiefly Red Kidneys in Ontario County. Severe in Wayne County. One field of certified beans 70 per cent blighted. In Monroe and Allegany Counties not much bacterial blight, several small areas in each field; blight not nearly so severe as in 1924. Abundant in Wayne County. General in Genesee and Wyoming Counties. Reduction in yield average of all beans 15 per cent, though much greater in Red Kidneys than in other varieties. Some fields of Red Kidneys ruined. (Chupp)

Georgia (southern): Scattered sparingly in Coastal Plain on fall crop (snap beans). Found only in low, damp fields or under irrigation. (Boyd)

Texas: Quite prevalent this year in lower Rio Grande Valley on all wax bean varieties. (Taubenhaus)

Indiana: The most susceptible variety was Burpee's Stringless Greenpod. Rather large canning acreage involved. In variety plots grown by Dr. E. E. Mains at Lafayette, blight occurred on 45 out of 49 varieties. None on Michigan White Wax, New Kidney, or Longfellow. (Gardner)

Michigan: Blight was checked by very dry season and late planting. Developed rapidly late, but too late to cause the usual amount of loss. (Nelson)

Wisconsin: Wardwell Wax most severely injured. We have recommended that this variety be eliminated from next year's plantings by canners. (Vaughan)

Montana: Morris reported it to be severe on Great Northern variety in the Yellowstone section.

Colorado: In Greeley district became severe toward end of season under influence of much moisture. In some cases very severe. The early season was remarkably free from blight. (MacMillan)

Table 28. Estimated average percentage loss from and relative prevalence to bacterial blight in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
N. Y.	15	More	--	Ohio	1	Same	Same
La.	5	Less	Less	Minn.	1	Same	More
Ind.	5	More	More	Ariz.	1	--	--
Iowa	5	More	--	Mass.	Trace	Less	Less
Mich.	4	Less	Same	Del.	Trace	Less	Less
Va.	3	Less	--	W. Va.	Trace	Same	Same
Mont.	3	More	More	S. C.	Trace	Less	Less
Tenn.	2	--	--	Ga.	Trace	Less	Less
Wis.	2	More	More	Ark.	Trace	Less	Less
N. Mex.	2	Same	Same	N. Dak.	Trace	Same	Same
Md.	1.5	Same	Same	Idaho	Trace	--	--
Miss.	1	--	--	N. H.	-	Same	Same
Texas	1	--	--	Ala.	-	Same	Same

Recent literature:

1. Hedges, Florence. Bacterial wilt of beans (Bacterium flaccumfaciens Hedges), including comparisons with Bacterium phaseoli. Phytopath. 16: 1-22. Jan. 1926.

BACTERIAL WILT CAUSED BY BACTERIUM FLACCUMFACIENS HEDGES

Bacterial wilt was reported by Barss from Oregon as follows:

> "Bacterial wilt was of considerable importance near Eugene in the Blue Lake variety of green bean, affecting about 5 per cent of the plants in mature fields. It occurred only in this variety, of which there were probably 50 acres. Refugee, Kentucky Wonder, and Burpee's Stringless in the same fields were not affected. Beans had not been grown on this land the year before. The seed came from California."

Concerning the present known distribution of bacterial wilt, Miss Hedges says (1):

> "The disease has been isolated from wilted navy bean plants from South Dakota, Michigan, Virginia, and Maryland; and from seed from South Dakota, Montana, Michigan, Maryland, District of Columbia, France and Germany. The author believes the disease is rather widely distributed in bean-growing sections but that it has been confused with the blight caused by *Bact. phaseoli*, and that in all probability the greater part, if not all, of the seedling wilt reported by the Plant Disease Survey of the Bureau of Plant Industry in Indiana, Michigan, Minnesota, New Jersey and Maryland in 1917, Minnesota and Connecticut in 1918, and New Jersey in 1920 was due to *Bact. flaccumfaciens*. In the summer of 1922 some Michigan fields showed as high as 90 per cent of the crop affected. It was the most serious disease affecting Michigan beans that season."

Recent literature:

1. Hedges, Florence. Bacterial wilt of beans (Bacterium flaccumfaciens Hedges), including comparisons with Bacterium phaseoli. Phytopath. 16: 1-22. Jan. 1926.

RUST CAUSED BY UROMYCES APPENDICULATUS (PERS.) LK.

Rust was reported as occurring in most of the states but the only losse greater than a trace reported were 8 percent on string beans in California, one per cent in New Mexico, and one-half per cent in Texas. Since injury from rust is usually less when the disease appears late in the season than when it appear earlier, dates of its first observed appearance may be of interest. In 1925 they were as follows:

May 1	Georgia	Thomas County
June 18	New Jersey	Bridgeton
July 6	New York	Genesee County
July 14	South Carolina	Gaffney
August 13	Connecticut	Ledyard

MOSAIC, CAUSE UNDETERMINED

The most severe injury from mosaic reported was from the western and middle western states, especially Montana, Arizona, Iowa, Idaho, Indiana, Utah, and California.

In Indiana, Gardner reported the disease to be severe on Kentucky Wonder in gardens. He stated that mosaic occurred in 48 of the 49 varieties grown in Doctor Mains' plots at Lafayette. In Wisconsin, Vaughan stated that it was most prevalent on the Refugee green variety.

Table 29. Estimated reduction in yield of beans due to mosaic, 1925.

Percentage loss	States reporting	Percentage loss	States reporting
8	Montana	Trace	Maine, Massachusetts, New Jersey, Delaware, Maryland, Virginia, West Virginia, South Carolina, Georgia, Florida, Kansas, North Dakota, Kentucky, Louisiana, Arkansas
5	Iowa, Arizona		
4	Idaho		
3	Indiana, Utah, California		
2	New Mexico, Washington		
1	Michigan, Wisconsin, Minnesota		
0.5	New York		

Elmer (1) states that he succeeded in infecting tomato, tobacco, and _Nicotiana alata_ with bean mosaic virus.

Recent literature:

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. Feb. 1925.

ROOTROT CAUSED BY FUSARIUM SPP.

Dry rootrot caused by _Fusarium martii phaseoli_ Burk. was reported from Maine, New York, Florida, and Indiana, and somewhat doubtfully from Oregon. A loss of 5 to 7 per cent was estimated in New York, where the disease was said by Chupp to be quite serious in many fields throughout the state. Weber reported that in Florida this rootrot was rather scarce, having been collected in only two fields in the central part. In Indiana it was observed only at Lafayette on Kentucky Wonder, according to Gardner. Barss reported from Oregon that "Rootrot, caused by _Fusarium_ (_martii_ probably), although probably present has not been recognized previously. In a field near Corvallis there was hardly a normal plant in four rows 50 feet long. The roots showed mycelium in the tissue and typical symptoms."

Dry rootrot caused by Fusarium sp. was reported from Idaho by Hungerford who stated that "Tests of varieties have shown Robust very susceptible, Great Northern moderately resistant, and Red Mexican resistant."

Rootrots due to undetermined species of Fusarium were reported from South Carolina, Georgia, Kansas, New Mexico, and California. Boyd stated that in southern Georgia nematode injury predisposed the roots to attack of Fusaria and other organisms.

Recent literature:

1. Small, W. Notes on species of Fusarium and Sclerotium in Uganda. Bul. Misc. Inform. Kew 1925: 118-126. 1925.
Fusarium udum Butl. and Fusarium sp. associated with bean rootrot, together with other organisms.

OTHER DISEASES

Cercospora cruenta Sacc., leafblotch, was reported from Georgia, South Carolina, Florida, Texas, and Porto Rico. Boyd reported it to be more destructive to late bunch and pole beans than to commercial plantings of early bunch beans, and estimated the reduction in yield at 2 per cent in southern Georgia.

Erysiphe polygoni DC., powdery mildew. Florida, Texas, Arizona, California, and Porto Rico reported powdery mildew. Weber states that in Florida "It is generally found during late fall and winter on beans in the southern part of the state." Losses reported as due to powdery mildew were one-half to one per cent in Texas, one per cent in Arizona, and 5 per cent on string beans in California.

Isariopsis griseola Sacc., leafblotch, was reported from Delaware by Adams, and from Florida by Weber who says, "This disease caused considerable damage to beans growing in the late fall. The plants were completely defoliated and the pods often attacked. The loss in several fields was from 70 to 100 per cent. It was reported only from the Florahome section."

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot, was reported from Georgia, Texas, and Kansas. Boyd estimated a loss of 5 per cent in southern Georgia. He stated that it was general in the Coastal Plain, being decidedly worse in old gardens and in sandy soils, and apparently thriving in spite of dry weather during the summer. Nematode attack seemed to favor infection by Fusarium and Sclerotium rootrots. Taubenhaus reported rootknot to have been prevalent in light sandy loams in Texas and estimated the loss at one-half per cent.

Corticium vagum Berk. & Curt. States reporting Rhizoctonia rootrot in 1925 were Massachusetts, New York, Virginia, South Carolina, Georgia, Florida, Texas, New Mexico, and Porto Rico. Chupp wrote that in New York, "Much of the stem canker or rootrot seems to have been caused by this organism because of the wet weather." Weber reported a loss of one per cent in Florida and said that, "This trouble has been very common on beans and ranks with the most important of the bean diseases. It is statewide and can be found in all bean fields." In New Mexico also the loss was estimated at one per cent.

Weber reported a leafblight due to this organism as attacking the first leaves of 50 per cent of seedling plants in a forty-acre field near Florahome, Florida, in September.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot, pod rot (3). New York, Florida, and Washington reported this fungus on beans in 1925. In New York it is never very important, according to Chupp. In Florida, Weber said, "This is general and of major importance in the state, attacking plants in the field often in an alarming manner. It causes the major amount of loss to Florida beans in transit."

Sclerotium rolfsii Sacc., stemrot, reported from Georgia, South Carolina, Florida, and Louisiana.

Small (4) reports that S. rolfsii Sacc., S. bataticola Taub., and several other organisms were found to be associated with a footrot or wilt of beans in Uganda. S. bataticola was the only one of these fungi proving to be pathogenic, except Fusarium udum Butl. under unusual conditions. S. rolfsii as observed in Uganda seems to be saprophytic.

Macrophoma phaseoli Maub., associated with foot or stemrot, was reported from South Carolina by Ludwig. Apparently the first report of the occurrence of this fungus in this country was from the same state in 1923. According to Ludwig the severity of attack seems to be dependent upon the amount of moisture and the disease need not be feared in dry weather.

Thielavia basicola (Berk. & Br.) Zopf, black rootrot. A trace was reported from New York.

Ozonium omnivorum Shear, rootrot, was prevalent in the black lands of Texas, causing a loss estimated by Taubenhaus at 1.5 per cent.

Pythium debaryanum Hesse, damping-off. Porto Rico.

Bacillus carotovorus Jones (1) is reported to be the cause of a new disease of runner beans. It causes a rot of stem, base, and roots, appearing first some three or four weeks after planting.

An undetermined bacterial rootrot was reported by Chupp from Orleans County, New York.

Curly top (?) (undet.). Eubanks Carsner (2) reports the occurrence in Idaho in 1924 of a disease of bean which was apparently due to infection with the virus of sugar beet curly top disease. Experiments indicated that this was the case, but further investigation is necessary before it can be stated definitely that the curly top virus is the cause.

Chlorosis was reported from Texas and Virginia. In Texas, Taubenhaus attributed it to excess of lime in the soil, and estimated the loss due to it at one-half per cent. In Virginia the trouble resembled mosaic and was found in acid soils with a high content of aluminum toxins, according to McWhorter.

Hopperburn. Sherwood of West Virginia says "Early crop of beans extensively injured."

Recent literature:

1. Butcher, R. W. A bacterial disease of the roots of runner beans. Mycological Investigations. Ann. Rept. Exp. & Res. Sta. Nursery & Mark. Gard. Industr. Dev. Soc. 10: 66-69. 1925.

2. Carsner, Eubanks. A bean disease caused by the virus of sugar beet curly-top. (Abstract) Phytopath. 15: 731-732. Nov. 1925.

3. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

4. Small, W. Notes on species of Fusarium and Sclerotium in Uganda. Bul. Misc. Inform. Kew 1925: 118-126. 1925.

5. Tilford, P., C. F. Abel, and R. P. Hibbard. An injurious factor affecting the seeds of Phaseolus vulgaris soaked in water. Papers Michigan Acad. Sci. 4: 345-356. 1925.

DISEASES OF LIMA BEAN

BACTERIAL SPOT CAUSED BY BACTERIUM VIGNAE GARDNER & KENDRICK (B. VIRIDIFACIENS TISDAIE & WILLIAMSON)

The following reports of bacterial spot were received in 1925:

Delaware: Observed August 12 at Wyoming, Kent County, on pole limas. Five per cent of the pods showed infection. This is the first report for the state. (Adams)

Indiana: Not serious (but rather prevalent in Floyd County). Mainly leafspot. Noted in plots on varieties New Wonder, King of the Garden, and Giant Podded. Good resistance shown by Henderson's Bush. (Gardner)

Michigan: More than usual; of major importance in canning crop. Caused a loss of 10 per cent. Destructive to early plantings. The disease is seed-borne and it is very difficult to obtain clean seed. All seed treatments tried proved to be failures. (Nelson)

Gardner and Kendrick (2) report that Bacterium viridifaciens, described by Tisdale and Williamson on lima bean in 1923 (3), is the same organism as B. vignae Gardner & Kendrick, originally reported on cowpea (1). A number of legumes besides cowpea and lima bean have been found by observation and experiment to be hosts for this disease. Lima beans found to be susceptible include the varieties Large White Pole, Giant Podded Pole, and King of the Garden among pole limas (Phaseolus limensis), Burpee's Bush and Fordhook bush limas (P. limensis limenanus), and the dwarf sieva bean (P. lunatus lunonanus) as represented by Henderson's Bush. The disease, especially the leaf attack, seems to be very severe on limas.

The organism is carried in the seed, and long storage seems to eliminate it. Suggestions for control include primarily the use of disease-free seed, which can be obtained in small quantities by seed selection from disease-free pods. The use of two or three-year old seed should also result in a decreased amount of primary infection. Rotation of crops is advisable as a supplementary measure.

Recent literature:

1. Gardner, Max W., and James B. Kendrick. Bacterial spot of cowpeas.

Science n. s. 57: 275. March 2, 1923.

2. Gardner, Max W., and James B. Kendrick. Bacterial spot of cowpea and lima bean. Jour. Agr. Res. 31: 841-863. Nov. 1, 1925.

3. Tisdale, W. B., and M. M. Williamson. Bacterial spot of lima bean. Jour. Agr. Res. 25: 141-154. 1923.

OTHER DISEASES

Downy mildew caused by Phytophthora phaseoli Thax. was reported from Connecticut, New York, New Jersey, and Pennsylvania. In Connecticut there was considerable injury in one or two fields, according to Clinton. The loss on Long Island was estimated by E. E. Clayton at 10 per cent.

Leonian (1) makes P. phaseoli a variety of P. infestans.

Bacterial blight caused by Bacterium phaseoli EFS. was reported from Maryland and Indiana.

Pod blight caused by Diaporthe phaseolorum (Cke. & Ell.) Sacc. Unimportant in New Jersey (Dept. Plant Path.); a trace in Delaware (Adams).

Yeast spot caused by Nematospora phaseoli Wingard is reported by Wingard (2) as having been found on lima beans in Virginia and Illinois and in seed from Tennessee and Alabama. Other hosts than lima beans on which he has observed it, in each case only once, are Birdeye beans (Phaseolus vulgaris), Black Eye cowpeas (Vigna sinensis), and sweet potato. The small lima or sieva bean seems to be the most susceptible host. Larger types also are attacked, but not severely as a rule. The puncture of the green bug (Nezara hilaris) is apparently the only means of natural infection.

Mosaic (undet.) was reported from Delaware and Louisiana, and Gardner stated that in Indiana a few cases were noted in plots of Henderson's Bush.

Recent literature:

1. Leonian, Leon H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

2. Wingard, S. A. Studies on the pathogenicity, morphology, and cytology of Nematospora phaseoli: Bul. Torr. Bot. Club. 52: 249-290. June 1925.

DISEASES OF ONION

SMUT CAUSED BY UROCYSTIS CEPULAE FROST

In 1925 onion smut was reported from Massachusetts, New York, Maryland, Kentucky, Ohio, Illinois, Wisconsin, Minnesota, Iowa, North Dakota, Kansas, and Oregon.

Table 30. Losses from onion smut in 1925 as reported by collaborators.

Percentage loss	States reporting	Percentage loss	States reporting
10	New York	Trace	Maryland, Minnesota, Kansas
8	Wisconsin		
1	Ohio, Oregon		

It is gratifying to note that the majority of the collaborators report successful control of onion smut by the formaldehyde drip treatment. This method consists in the application of formaldehyde to the seed at planting time from a tank which is attached to the seed drill. Walker (5) recommended a 1-128 solution of formaldehyde applied at the rate of 200 gallons per acre. Anderson and Osmun (1) found that in Massachusetts a 1-50 solution could be used successfully at the rate of 60 to 80 gallons per acre, the largest amounts being required when the soil was wet.

Following are notes from collaborators on the prevalence and control of onion smut.

Massachusetts: Serious in absence of control measures. Formaldehyde treatment in general use throughout the Connecticut Valley. (Osmun & Davis)

New York: Onions on old muck rather severely infected. Infested area increasing in size in Genesee and Orleans Counties. Occurrence general in Wayne County. Satisfactory control by formaldehyde. (Chupp)

Ohio: Losses from smut decrease from year to year owing to the successful use of the formaldehyde drip. There is one large onion growing section in Ohio where smut appeared for the first time this year. (H. C. Young)

Illinois: Quite prevalent in the set-producing district about Chicago, but always well controlled where formaldehyde was carefully applied. (Tehon)

Wisconsin: Of major importance where not treated. The formaldehyde drip treatment is generally employed by large growers near Racine. (Vaughan)

Kansas: About one per cent in seedlings from Canary Island seed. None in native seed. (White) Note: Walker (6) in his survey of onion diseases in the Canary Islands did not observe any onion smut.

Oregon: Formaldehyde treatment very successful. (Barss)

Anderson (1), in studies on the susceptibility to smut of 39 species of Allium and 54 varieties of cultivated onion, found that the species could be divided on this basis into four classes, with the cultivated onion, (*Allium cepa*), shallot (*A. ascalonicum*), and chives (*A. schoenoprasum*), as well as other species including some native American ones, in the first or most susceptible group. None of the varieties of *A. cepa* tested showed any degree of resistance to smut. Infection takes place only through the cotyledons, and the disease does not occur in species which reproduce by bulblets. In the first class, after the primary attack the fungus may infect the growing point, thereafter producing lesions on the true leaves and finally killing the plant. In classes 2 and 3 only the cotyledons were affected, while no infection occurred on species in class 4, which seemed to be entirely resistant. The "Winterbeck onion", which may be a distinct species or only a variety of *A. cepa* proved to be practically immune to smut, and is regarded by Anderson as the logical parent species to use in breeding for a smut-resistant onion.

Urocystis cepulae is apparently the only species of Urocystis found on *Allium cepa*. Other Urocystes described on other species of Allium seem to be distinct. Anderson believes that *U. cepulae* originated in America, probably on one of the native western species included in the most susceptible group.

Recent literature:

1. Anderson, P. J. Comparative susceptibility of onion varieties and of species of Allium to Urocystis cepulae. Jour. Agr. Res. 31: 275-286. Aug. 1925.

2. ----------- and A. V. Osmun. The smut disease of onions, Massachusetts Agr. Exp. Sta. Bul. 221: 1-29. 1924.

3. Blizzard, Alpheus Wesley. Nuclear phenomena and life history of Urocystis cepulae. (Abstract) Phytopath. 16: 69. Jan. 1926.

4. Leach, J. G., and H. A. Rodenhiser. Onion smut control. Minn. Hort. 53: 113-115. April 1925.

5. Walker, J. C. Onion diseases and their control. U. S. Dept. Agr. Farmers' Bul. 1060: 1-23. 1919.

6. ----------- Observations on the cultivation and diseases of cabbage and onions in Europe, 1922. Plant Disease Reporter Supplement 32: 1-34. Feb. 15, 1924.

DOWNY MILDEW CAUSED BY PERONOSPORA SCHLEIDENI UNG.

Downy mildew was reported from Massachusetts, New York, Georgia, Wisconsin, North Dakota, Oregon, and California. In Massachusetts it was said to be very serious throughout the Connecticut Valley, and caused a loss estimated at 15 per cent. In California very heavy losses occurred in the onion seed crops in the Sacramento, San Joaquin, and Santa Clara Valleys. H. A. Jones estimated a loss to the seed crop of the state of 75 to 80 per cent, J. T. Rosa estimated 60 per cent, and D. G. Milbrath reported 80 per cent. Rosa reported on this disease in July as follows:

> "Complaints of dying of onions being grown for seed began to come in during April, and proved to be due primarily to mildew attacking the leaves and primary seed stalks. White varieties are attacked earliest and most severely. The disease was more severe where onions had been grown before. The yield of onion seed will be reduced by 60 per cent. Several thousand acres are involved. Early in June large acreages of market onions grown from seed were also attacked."

Regarding varietal susceptibility as observed in California, H. A. Jones stated that, "The foreign types like Giant Gibraltar, Sweet Spanish, Prizetaker, etc., with light green tops, appear to be somewhat more resistant than the storage varieties like Yellow Globe, Danvers, and Southport."

NECK ROT CAUSED BY BOTRYTIS SPP.

Neck rot said to be due to Botrytis allii Munn was reported in 1925 from New York, Virginia, Washington, and California. Specimens received from Virginia and California were determined by Dr. J. C. Walker to be this species. In Virginia the disease occurred on shallots in James City County and on Yellow Danvers onions from Illinois sets in Accomac County. The disease was thought to be the chief cause of low germination and rot of spring onions in Accomac County, one of the leading onion growing counties of Virginia according to McWhorter. Horne reported that in California, "White onions are most seriously affected - up to 15 per cent loss in some lots in November."

Neck rot caused by Botrytis sp. was reported from Virginia (Eastern Shore), Indiana, Wisconsin, Arizona, and Idaho. A loss of one per cent was estimated in Arizona, and a trace in Wisconsin.

Wisconsin: Less than usual, too dry at harvest time. Drying experiments lacked definiteness because weather was so dry that no neck rot developed to amount to anything in natural curing. (Vaughan)

Idaho: More than usual; considerable injury in Boise Valley and Twin Falls section. (Hungerford)

Walker (3) describes two new species of Botrytis associated with the neck rot disease of onion, in addition to Botrytis allii which was described by Munn (1) from Michigan and New York in 1917, and since that time observed in a number of states. Since these three species produce distinct, although similar symptoms, Walker has given them the following distinguishing names: 1, - the grey mold neck rot caused by Botrytis allii Munn; 2, - the mycelial neck rot caused by Botrytis byssoidea Walker; and 3, - the small sclerotial neck rot caused by Botrytis squamosa Walker. All three species are found in the Wisconsin and Illinois sections. B. byssoidea occurs also in Connecticut and in France. The mycelial neck rot causes by far the greatest losses in the Wisconsin and Illinois section, while the small sclerotial neck rot, found only upon white varieties and confined more particularly to the dry outer scales of the bulbs, is the least destructive. It has been found that the mycelial neck rot can be controlled by artificial curing (2).

In two other recent papers (4, 5) Walker reports results of continued studies on disease resistance in the onion. Colored varieties show resistance to smudge and neck rot which seems to be correlated with the presence in the dry outer scale tissue of the bulbs of a readily dissolvable substance, toxic to the fungous spores. This substance is not present in bulbs of white varieties, nor does it occur in the succulent tissue of colored varieties, as shown by the fact that spores placed directly on the succulent tissue will infect even colored bulbs.

Concerning susceptibility to Botrytis allii and Botrytis sp. (neck rot), Walker says (4):

> "Under moderately favorable conditions for infection, white varieties are often severely affected, while colored varieties remain quite free from the disease. Under the most favorable conditions for infection, however, the disease is often of consequence in the colored bulbs, but the degree of difference between them and the white bulbs remains essentially the same."

Recent literature:

1. Munn, M. T. Neck rot disease of onions. New York (Geneva) Agr. Exp. Sta. Bul. 437: 363-455. 1917.

2. Walker, J. C. Control of mycelial neck rot of onion by artificial curing. Jour. Agr. Res. 30: 365-373. Feb. 15, 1925.

3. ----------- Two undescribed species of Botrytis associated with the neck rot disease of onion bulbs. Phytopath. 15: 708-713. Nov. 1925.

4. ----------- Studies on disease resistance in the onion. Proc. Nation. Acad. Sci. 11: 183-189. March 1925.

5. -----------, C. C. Lindegren, and F. M. Bachmann. Further studies on the toxicity of juice extracted from succulent onion scales. Jour. Agr. Res. 30: 175-187. Jan. 15, 1925.

WHITE ROT CAUSED BY SCLEROTIUM CEPIVORUM BERK.

White rot was reported for the first time from Kentucky in 1925. Heretofore it had only been reported in this country from Oregon and Virginia. It was reported again in 1925 from Virginia. Specimens were sent in both from Kentucky and Virginia, and the identification of the fungus as Sclerotium cepivorum was confirmed by J. C. Walker.

McWhorter stated that in Virginia it occurred in the same locality in which it was found last year, that it developed in new ground during

March on sets of shallots which came from New Orleans, Louisiana, and that it was evidently introduced on the seed. Regarding its occurrence in Kentucky, Valleau wrote:

> "The disease appeared in the Prestonia neighborhood near Louisville. An area of about 150 feet by 50 or 60 feet was affected, as closely as we could judge, although the onions had been dug. It is in a bottom with drainage which centrally reaches a sewer, so that there is little danger of spread on the farm, at least from drainage water. Within about 25 or 30 feet of the infected area was a crop of onion sets being grown for the market. I was entirely unable to find any signs of injury to the plants next to the infected area or in any other part of the field.
>
> "About five years ago onion sets in this field were completely killed out in this same area. At the time it was thought the trouble was caused by an excessive amount of smut. Previous to that time onions had been grown in the field and no particular trouble was observed, but since that time one crop of onions was grown but no trouble was observed."

PINK ROOT CAUSED BY FUSARIUM MALLI TAUB.

In Louisiana pinkroot caused considerable damage in 1925 as usual, according to Tims. Tauberhaus reported it to be prevalent in Texas, and estimated a loss of one per cent. In California, Milbrath reported pink root to be worse than last year, estimating the loss for the state at one-half per cent. Reports from Ohio and California are as follows:

> Ohio: Pink root is quite generally distributed over the state and in some sections, where rotations have not been practiced, there have been some severe losses. (H. C. Young)
>
> California: This disease is again prevalent on onions grown in the warmer parts of the state, attacking both mother-bulbs grown for seed production, as well as seedlings of the market crop. There is some evidence that the disease may occur where onions have never been grown before. (Rosa)

OTHER DISEASES

Colletotrichum circinans (Berk.) Vogl., smudge, occurred widely but was reported in 1925 from Virginia and Wisconsin only, on white onions. Walker (3, 4) has continued his studies on the toxicity of onion juice to this and other organisms (See Botrytis).

Fusarium spp. (1, 4). Bulbrot was reported in 1925 from New York, Indiana, Minnesota, Iowa, Idaho, and Washington, and a specimen of F. cepa Hanzawa was received from Ohio. The following report was received from Washington:

> "This disease has been common and severe in the early onion section of the Walla Walla district. Its importance has been mentioned in reports of other years. It has not caused such large losses as in other years, due partly to spring onions being generally planted because of the general killing out of winter onions last winter." (Dept. Plant Path.)

Fusarium sp. Brittle was reported again from New York.

Macrosporium parasiticum Thüm. was reported as causing considerable loss locally in New York. The seed crop in Louisiana was damaged, according to Tims. In Minnesota the disease was said to be very common in the Plainview district, causing, or at least being associated with, early maturity.

Aspergillus niger Tiegh. black mold, caused losses estimated at one-half per cent in Texas, a trace in Arizona, and together with other surface molds, at 5 per cent in Indiana. Walker's work (3, 4) has not indicated any difference between white and colored varieties in susceptibility to this fungus.

Bacterial softrot was reported from New York, Indiana, Minnesota, and Arizona. A loss of one per cent was estimated in the last-named state.

Rots due to Penicillium, bacteria, etc., which developed during storage preceding transportation or in cars, were reported from Missouri.

Purple blight (undet.), New York "Purplish necrotic spots, which grew in size, were found on the leaves. This disease was observed for the first time in two fields. A Macrosporium was associated with the lesions on plants which were apparently not attacked by M. parasiticum." (Felix)

Striped foliage, thought to be due to toxicity of elm wood, was reported from New York by Felix, as follows "A distinct striping of leaves, yellowing and slight stunting. First observed in a mill yard which had been planted to onion and later in several muck fields in widely scattered areas. Leaves of Carex and certain grasses are also striped. In onions the striping appeared to bear no relation to the distribution of the veins. Lettuce and potatoes are yellowed and stunted."

Recent literature:

1. Link, G. K. K., and Alice A. Bailey. Fusaria causing bulb-rot of onions. (Abstract) Phytopath. 16: 74-75. Jan. 1926.

2. Ramsey, G. B., and L. F. Butler. Ammonia injury of fruits and vegetables in storage. (Abstract). Phytopath. 16: 73. Jan. 1926.

3. Walker, J. C. Studies on disease resistance in the onion. Proc. Nation. Acad. Sci. 11: 183-189. March 1925.

4. -----------, C. C. Lindegren, and F. M. Bachmann. Further studies on the toxicity of juice extracted from succulent onion scales. Jour. Agr. Res. 30: 175-187. Jan. 15, 1925.

DISEASES OF CRUCIFERS

CABBAGE

YELLOWS CAUSED BY FUSARIUM CONGLUTINANS WOLL.

Yellows was reported in most of the states east of Colorado and New Mexico. The largest losses in 1925 were reported from Iowa, Kansas, and West Virginia. Many collaborators report that the disease is more severe in home gardens than in commercial plantings, due to the fact that commercial growers avoid planting cabbage in infested soil. Miles and Blain state that in Alabama it is controlled to some degree by early planting. States reporting successful control from the use of yellows-resistant varieties are Maryland, Kentucky, Ohio, and Indiana. Progress in the selection of resistant varieties is reported from the Wisconsin, Iowa, and Missouri stations.

Kentucky: More specimens received this year from home gardens than usual. Commercially not important as growers do not use infested soil. Yellows-resistant All Seasons successful on infested soil at Louisville. (Valleau & Gardner)

Florida: Found in a single field near Gainesville where it was causing 50 per cent damage. Very seldom observed because plants are grown in winter and harvested when heads weigh from 2 to 4 pounds. (Weber)

Michigan: Minor importance, apparently confined so far to local areas in southern portion of the state. One seed company reports strong indications of seed transfer of the organism. Variety Volga very susceptible. (Nelson)

Kansas: Iacope showed 40 to 50 per cent yellows in one test in Topeka. (White)

Table 31. Relative prevalence of and losses caused by cabbage yellows in 1925, as reported by collaborators.

State	Estimated percentage loss 1925	Prevalence compared with		State	Estimated percentage loss 1925	Prevalence compared with	
		1924	Average year			1924	Average year
Iowa	20	Same	--	N. Y.	0.5	--	--
Kans.	10	Same	Same	Mich.	Trace	Same	Same
W. Va.	10	More	More	Minn.	Trace	More	More
Md.	8	Same	Same	N. J.	-	Same	Less
Ohio	6	Less	Same	Del.	-	Less	Less
Texas	4	--	--	Ark.	-	Same	Same
Ala.	3	Same	Same	Ind.	-	Less	--
N. Mex.	3	More	More	Wis.	-	More	Same

Recent literature:

1. Jones, L. R., J. C. Walker, and John Monteith, Jr. Fusarium resistant cabbage: progress with second early varieties. Jour. Agr. Res. 30: 1027-1034. 1 June 1925.

2. Quinn, J. T. Cabbage seed selection for disease resistance. In Mumford, F. B. New knowledge. Missouri Agr. Exp. Sta. Bul. 228 (Ann. Rept. Director 1923/24): 61-62. Jan. 1925.

3. Russell, H. L., F. B. Morrison, and W. H. Ebling. Cabbage disease studies. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 14-15. April 1925.

4. Van Haltern, Frank, and A. T. Erwin. A yellows resistant strain of Copenhagen market cabbage, Iacope. (Abstract) Phytopath. 16: 72. Jan. 1926.

5. Walker, J. C. Studies upon the inheritance of Fusarium resistance in cabbage. (Abstract) Phytopath. 16: 87. Jan. 1926.

6. -----------, John Monteith, Jr., and F. L. Wellman. A new Fusarium resistant cabbage. (Abstract) Phytopath 16: 72-73. Jan. 1926.

BLACKROT CAUSED BY BACTERIUM CAMPESTRE (PAM.) EFS.

Blackrot was reported from approximately the same territory as yellows. In most states collaborators regarded the disease as relatively unimportant in 1925. The largest estimated loss was 7 per cent reported by Miles and Blain from Alabama, where blackrot was said to have been quite serious locally in the southern part of the state. Other loss estimates were 4 per cent, Minnesota; 2 per cent, Ohio; one per cent, West Virginia, Texas; trace, New York, Maryland and Georgia.

Following are statements from some of the collaborators on the occurrence and control of blackrot.

New York: Long Island loss is estimated at from 3 to 5 per cent. Several cases noted in Erie County. Present in seedbeds where seed treatment was not practiced in Nassau County. Seed treatment is gradually eliminating this trouble. (Chupp)

Kentucky: In some gardens blackrot was very prevalent. Imported plants of "Frostproof" developed considerable trouble. (Gardner)

Florida: Collected in the state, but not important. (Weber)

Ohio: The disease occurred primarily on late growing cabbage and was partly responsible for breakdown in transit. (H. C. Young)

Illinois: Much less prevalent than usual. We have but one observation, and there were no reports. (Tehon)

Minnesota: Present in all cabbage growing sections in certain fields. One seed treatment demonstration (mercuric chloride) failed to control the disease. (Sect. Plant Path.)

New Mexico: Trace, not important. Most growers treat their seed. (Crawford)

Recent literature:

1. Russell, et. al. See yellows.

2. Samuel, Geoffrey. "Blackspot" (sic) disease of cabbages and cauliflowers. Jour. Dept. Agr. South Australia 28: 974. June 1925. (Should be black rot).

3. ----------- Black rot of cabbages and cauliflowers in South Australia. Jour. Dept. Agr. South Australia 28: 1071-1076. July 1925.

BLACKLEG CAUSED BY PHOMA LINGAM (TODE) DESMAZ.

Twelve states reported no blackleg and fifteen reported it present and either severe locally or unimportant. In Maryland it is one of the most prevalent and destructive diseases in the important Patapsico Neck trucking section, which is located in Baltimore County just outside of Baltimore city. The intensive production of cabbage there makes long-time rotation difficult to practice, hence it is not easy for the cabbage growers to rid their soil of the pathogen, after it once becomes well established. The loss from blackleg in Maryland was estimated at one and one-half per cent. Other loss estimates were 2 per cent in Minnesota; and a trace in West Virginia and Iowa. Following are some of the statements from collaborators regarding blackleg.

Massachusetts: Very serious in some instances. (Osmun & Davis)

Connecticut: Two reports of moderate injury. (Clinton)

New York: Serious in some fields in Ontario County. (Burrill)
Caused severe losses in a few fields. As more urgent requests are brought to bear upon the seed grower for clean seed, this trouble will finally disappear. All our local seed grower's are making determined efforts to grow healthy seed. (Chupp)

New Jersey: In one field severe infection was found in Low Flat Dutch and All Season. These same varieties from another plant bed planted in adjacent rows showed no infection. (Dept. Plant Path.)

Virginia: A serious form is present on the spring crop in the Tidewater section. Diseased plants generally die before forming a head. Typical stem and leaf lesions present. (McWhorter)

Wisconsin: One badly infested seed bed north of Racine from which plants were distributed. Growers need more education as to dangers of selling diseased plants. (Vaughan)

Minnesota: Very bad in a few fields in the vicinity of St. Paul. Several outbreaks traced to one lot of plants from a seed bed planted in one end of an old cabbage field. (Sect. Plant Path.)

Recent literature:

1. Rex, E. G. Experiments on the control of black-leg disease of cabbage. Pennsylvania Agr. Exp. Sta. Bul. 199: 1-23. Oct. 1925.

2. Russell, et. al. See yellows.

CLUBROOT CAUSED BY PLASMODIOPHORA BRASSICAE WOR.

Clubroot was reported from thirteen states in 1925, all of which are located in the north-central or northeastern part of the country. It was reported not found in twelve states located mostly in the South and West. The absence of clubroot from these sections is due to the fact that the clubroot organism (Plasmodiophora brassicae) thrives best where soil temperatures are comparatively low. In most of the states from which clubroot was reported it was considered relatively unimportant except locally.

Maryland: Limited almost entirely to higher altitudes in Garrett and Allegany Counties where it is severe in most home gardens and in a few fields. (Temple & Jehle)

Ohio: One field of 20 acres of cabbage grown on muck land was about a total loss. Mostly occurs, however, in gardens. Estimated loss for state 2.5 per cent. (H. C. Young)

Michigan: Has been reported each year for some time from Grand Rapids and vicinity. (Nelson)

Minnesota: Present in about the usual amount. Probably a little more abundant than last year. Seems to be spreading slowly throughout cabbage growing sections. (Sect. Plant Path.)

Recent literature:

1. Ludwigs, Karl. Die Bekämpfung der Kohlhernie (Plasmodiophora brassicae). (The control of club root.) Mitteil. Deutsch. Landw. Ges. 40: 314-316. April 25, 1925.
Use of uspulun for soil disinfection.

2. Riehm, E. Zur Bekämpfung der Kohlhernie. Deut. Obst. u. Gemüseb. Zeit. 71: 193-194. April 10, 1925.

DAMPING-OFF AND WIRESTEM CAUSED BY CORTICIUM VAGUM BERK. & CURT.

In a recent publication (1), Gratz has proposed the name "wirestem" for plants attacked by the fungus Corticium vagum in the damping-off stage, but later recovering. The strain of Corticium vagum causing wirestem is thought to be physiologically distinct from that causing potato disease, since neither strain is pathogenic to the host of the other.

The following report of wirestem was received by the Survey from R. P. White of Kansas:

> "This year has seen two unmistakable cases of disease being brought into the state on plant parts. Mr. A. M. Walker, nurseryman at Pittsburg, Kansas, sent in specimens of cabbage plants which he had received from Thomasville, Georgia. These plants showed typical wirestem as described by L. O. Gratz, and Rhizoctonia solani was easily isolated from the diseased stems. This does not represent a serious introduction, I feel, since we have plenty of Rhizoctonia solani in our soils that would probably infect cabbage seedlings if conditions were favorable. It is notable, however, that I have never seen this disease in the cabbage seedling beds of this state."

Damping-off due to this organism was reported from Connecticut and New York, footrot from South Carolina, and stem and rootrot from Louisiana.

Recent literature:

1. Gratz, L. O. Wire stem of cabbage. New York (Cornell) Agr. Exp. Sta. Mem. 85: 3-60. Jan. 1925.

DOWNY MILDEW CAUSED BY PERONOSPORA PARASITICA (PERS.) D BY.

The largest loss from downy mildew in 1925 was 6 per cent reported from Texas by Taubenhaus, who stated that the disease was "Very prevalent on early cabbage." A trace was reported by Chupp in New York. Other states reporting downy mildew were Virginia, Florida, Louisiana, and Washington.

Virginia (Norfolk Section): The cabbage here, especially in wind-blown areas, is being yellowed by a field infection of Peronospora parasitica. The peculiar thing about this season's appearance is the fact that it is attacking rather large plants, some of which are beginning to head out. The farmers have mistaken the disease for yellows. It appeared after a period of warm weather, followed by six days of cool weather. (McWhorter, April 9)

Florida: Downy mildew is very common on cabbage at all times, especially in the seed bed. Its occurrence is general over the state and occasionally the damage to mature heads is considerable. (Weber)

Louisiana: Some damage to young plants. (Tims)

Recent literature:

1. Ocfemia, G. O. The occurrence of the white rust of crucifers and its associated downy mildew in the Philippines. Philipp. Agr. 14: 289-296. Oct. 1925.

OTHER DISEASES

Alternaria brassicae Berk. & Curt., black leafspot. Reported from New York (general; estimated loss one to 3 per cent), South Carolina, Georgia, Florida, Iowa (estimated loss, trace), and Porto Rico. One field in Cortland County, New York, according to Chupp, showed very severe infection where the soil was unusually heavily fertilized.

Bacillus carotovorus Jones, softrot, was reported only from New York, Wisconsin, Minnesota, and Iowa in 1925. In New York it was statewide and important on mother seed plants, according to Chupp, causing a loss of one to 5 per cent in seed cabbage and a trace in field cabbage. In Wisconsin, where there was less than usual, it followed injury by blackrot, blackleg, or maggots, according to Vaughan. In Minnesota the Section of Plant Pathology reported that it occurred chiefly in the form of "stump rot" and was very severe in some fields following an attack of cabbage maggots. Iowa reported a loss of one per cent.

Bacterium maculicolum McC., peppery leafspot, occurred in Connecticut for the first time, according to Clinton, and was reported from New York also.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot. In Georgia rootknot was said by Boyd to be common in home gardens but not in larger plantings, losses slight. Taubenhaus reported it to be prevalent in light sandy loams in Texas, estimating the loss for the state at one-half to one per cent.

A species of Pythium, believed to belong to the debaryanum group, was isolated by Drechsler (3) from cabbage showing watery softrot, and in inoculation experiments proved capable of reproducing the decay.

Sclerotinia sclerotiorum (Lib.) Mass. (1, 2) watery softrot, drop. New York "Loss, trace to 1 per cent; statewide on late harvested kraut cabbage." (Chupp). Florida "Considerable damage was caused in the field by this disease, although it was not common. It caused 50 per cent loss, attacking the heads, in several fields." (Weber). Davis (1, 2) reports this organism causing drop of common cabbage and Chinese cabbage in Massachusetts.

Sclerotium rolfsii Sacc., stemrot. Reported from Texas and Georgia.

Recent literature:

1. Davis, W. H. Drop of Chinese cabbage and common cabbage. (Abstract) Phytopath. 15: 50. 1925.

2. Davis, W. H. Drop of Chinese cabbage and our common cabbage caused by Sclerotinia sclerotiorum (Lib.) Massee (Sclerotinia libertiana Fckl.) Phytopath. 15: 249-259. May 1925.

3. Drechsler, Charles. Pythium infection of cabbage heads. Phytopath. 15: 482-285. 1925.

4. Ocfemia, G. O. The occurrence of the white rust of crucifers and its associated downy mildew in the Philippines. Philipp. Agr. 14: 289-296. Oct. 1925.

CAULIFLOWER

WIRESTEM CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Wirestem was reported from New York and Virginia.

New York: Estimated loss for state one to 3 per cent. Important in some seedbeds and fields; statewide. In Delaware County fully half the cauliflower growers used mercuric chloride in seedbed with excellent results. Almost entirely controlled where one ounce of mercuric chloride to 10 gallons of water was applied three to five times. A few seedbeds were completely destroyed in Onondaga County. (Chupp)

Virginia: Wirestem was important in flat and coldframe plantings in Norfolk County during the early spring. The disease responded quickly to organic mercury treatments. (McWhorter)

PEPPERY LEAFSPOT CAUSED BY BACTERIUM MACULICOLUM MC.

Peppery leafspot was observed in Connecticut for the first time, according to Clinton, and was reported also from New York and Florida.

New York: Occurs wherever cauliflower is grown in the state; important in some seedbeds. Caused a loss of one to 2 per cent. In a survey of cauliflower seedbeds in the Catskill region, little or no spotting was found where the seed had been treated with mercuric chloride 1-1000. In a few untreated beds the disease caused much loss. It was quite noticeable on early cauliflower in Nassau County. (Chupp)

Florida: Collected in scattered places in the state, not important. (Weber)

OTHER DISEASES

Alternaria brassicae (Berk.) Sacc., black leafspot, unimportant in Delaware; severe in one five-acre planting in New Jersey.

Bacterium campestre (Pam.) EFS., blackrot. Virginia (Tidewater region; also on broccoli), Iowa (loss 2 per cent).

Fusarium conglutinans Woll., yellows, Wisconsin.

Phoma lingam (Tode) Desm., blackleg. Reported by McWhorter as common and severe in the Norfolk section of Virginia.

Plasmodiophora brassicae Wor., clubroot. Western Maryland, Michigan, Wisconsin.

Damping-off caused by several organisms. "A survey was made of cauliflower seedbeds on 21 farms in the Catskill region of Delaware County, New York. Where no control measures were practiced there was considerable damping-off, in a few cases as much as 20 per cent. Where copper sulfate, copper carbonate, or corrosive sublimate was used there was little or no damping-off." (Chupp)

Whiptail (nonpar.) was again reported from Long Island, New York, where it caused a loss estimated at 15 per cent. A trace was reported from the Catskill region.

BRUSSELS SPROUTS

Blackleg caused by Phoma lingam (Tode) Desmaz. was reported only from New York in 1925, although it doubtless occurs in other states. In New York the loss was estimated at one to 3 per cent. Much injury to Brussels sprouts in the Catskill region was reported. In regard to control Chupp says, "As more urgent requests are brought to bear on the seed grower for clean seed, this trouble will finally disappear."

CHARLOCK

Powdery mildew caused by Oidium sp. New Jersey; produced flour-like patches on the leaves.

CHINESE CABBAGE

Drop caused by Sclerotinia sclerotiorum (Lib.) Mass. was reported by Davis (2) from Massachusetts. Davis stated that this was apparently the first report of the occurrence of this organism on Chinese cabbage.

Leafspot caused by Cylindrosporium sp. A single report from Florida.

Recent literature:

1. Davis, W. H. Clubroot of Chinese cabbage. Mycologia 17: 160-162. July-Aug. 1925.

2. ----------- Drop of Chinese cabbage and our common cabbage caused by Sclerotinia sclerotiorum (Lib.) Massee (Sclerotinia libertiana Fckl.) Phytopath. 15: 249-259. May 1925.

COLLARDS

Blackrot caused by Bacterium campestre (Pam.) EFS. was reported by McWhorter as very severe in the Norfolk region of Virginia during the fall of 1925.

HORSERADISH

White rust caused by Albugo candida (Pers.) Kuntze, New York, statewide, loss, a trace to 1 per cent.

Gray leafspot caused by Alternaria herculea (Ell. & Mart.) Elliott, Delaware, New Jersey.

Leafspot caused by Cercospora armoraciae Sacc., Indiana.

Leafspot caused by Ramularia armoraciae Fckl., New York, causes much leaf injury, statewide, estimated loss 1 to 2 per cent, New Jersey.

Mosaic (Undet.). Trace reported from New York.

KALE

Blackrot caused by Bacterium campestre (Pam.) EFS. was reported from the Norfolk section of Virginia, but very little was observed and it was of no importance according to McWhorter.

Recent literature:

1. McWhorter, Frank P. Blackrot of kale. Virginia Truck Exp. Sta. Bul. 49: 359-363. Oct. 1924.

KOHLRABI

Yellows caused by Fusarium conglutinans Woll., Indiana and Wisconsin.

MUSTARD

White rust caused by Albugo candida (Pers.) Kuntze. More than last year in Florida; less in New York.

Downy mildew caused by Peronospora parasitica (Pers.) D By was collected in Florida.

RADISH

Blackroot caused by Pythium aphanidermatum (Edson) Fitz. Reported from Indiana and Kansas. In Indiana it was serious in some home gardens and seemed to be especially prevalent around Lafayette. In Kansas, two entire crops of the White Icicle variety were reported lost.

Blackrot caused by Bacterium campestre (Pam.) EFS. was reported by Chupp as occurring each year on volunteer radishes in one garden in Tompkins County, New York.

White rust caused by Albugo candida (Pers.) Kuntze was reported from New York and Indiana.

Spot caused by Alternaria sp., Indiana, caused black lesions on leaves, peduncles, and seed pods. (Gardner)

Softrot caused by Bacillus carotovorus Jones (1). New York.

Downy mildew caused by Peronospora parasitica (Pers.) D By. was reported from New York and Indiana.

Mosaic (Undet). A typical mosaic mottling and deformation of leaves occurred on ten varieties in experimental plots at Lafayette, Indiana. First record of this disease.

Recent literature:

1. Roldan, E. F. Notes on soft rot of radish. Philipp. Agr. 14: 185-188. Aug. 1925.

RUTABAGA

Scab caused by Actinomyces scabies (Thax.) Guess., New Jersey.

Leafspot caused by Cercosporella albo-maculans Ell. & Ev. Specimens determined by J. G. Leach sent from Carlton County, Minnesota; reported as

"Causing most of the leaves to fall. An adjoining field from different seed shows none."

Stemrot caused by *Rhizoctonia* sp., Washington.

Recent literature:

1. Tennent, R. B. Club-root in turnips. Trials with 'disease resistant' varieties in Otago and Southland. New Zealand Jour. Agr. 30: 259-269. 1925.
2. Whitehead, T. Experiments with 'finger and toe' disease of swedes; with a note on loss caused by rabbits. Welsh. Jour. Agr. 1: 176-184. Jan. 1925.

TURNIP

Rootknot due to *Heterodera radicicola* (Greef) Muell. (*Caconema radicicola* (Greef) Cobb). A specimen was received from Dorchester County, Maryland, where it was reported to be severe in a local area in the field. Boyd reported that in southern Georgia the disease was generally of slight importance, but was observed to be severe in three gardens.

Leafspot caused by *Cercosporella albo-maculans* (Ell. & Ev.) Sacc. was reported by Boyd to be general on the winter crop in Georgia, causing premature death of leaves.

White rust caused by *Albugo candida* (Pers.) Kuntze, prevalent in Texas. (Taubenhaus)

Anthracnose caused by *Colletotrichum higginsianum* Sacc. was reported from South Carolina.

Scab caused by *Actinomyces scabies* (Thax.) Guess., New Jersey.

Mosaic (undet.) Reported by Gardner from Indiana as, "Serious locally; plants stunted. Ruined an experimental plot of the Horticultural Department at Lafayette. Results of heavy aphis infestation." Also reported from Kansas.

Rot caused by *Rhizoctonia* sp. was reported from Washington.

Recent literature:

1. Tennent, R. B. Club-root in turnips. Trials with 'disease resistant' varieties in Otago and Southland. New Zealand Jour. Agr. 30: 259-269. April 1925.
2. Wormald, H., and R. V. Harris. Note on the bacterial softrot of turnips. Ann. Appl. Biol. 12: 326-329. July 1925.

DISEASES OF CUCURBITS

MUSKMELON

LEAFBLIGHT CAUSED BY MACROSPORIUM CUCUMERINUM ELL. & ARTH.

Leafblight was reported in 1925 from eleven states, all east of the Mississippi River. All but one (Indiana) reported less than last year and most of them less than in average years. The decreases in the losses from blight were doubtless due to two factors: the low precipitation during the summer of 1925, and the increase in the practice of spraying and dusting.

The estimated losses reported by collaborators are: 25 per cent in southern Georgia, 6 per cent in Texas and Indiana, 3 per cent in Maryland, and a trace to one per cent in New York. In Michigan the disease was said to be very common each year in unsprayed fields, and in 1925 it was important in the western part of the state. In other states blight was considered relatively unimportant. In Maryland the practice of dusting cantaloupes with dehydrated copper sulfate and lime has increased greatly, due to the efforts of extension workers, and has resulted in a striking improvement in quality, coupled with a decrease in losses from this and other diseases.

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

In 1925 wilt was reported from Connecticut, New York, Maryland, Florida, Ohio, Indiana, Michigan, Iowa, and Kansas. In most of the states it was considered to be relatively unimportant. The largest loss, 7 per cent, was reported from Iowa. Other losses reported were: New York and Indiana, 3 per cent; Maryland, a trace. Reports from Michigan and Ohio are as follows:

Michigan: Commonly reported on cucumbers and melons wherever grown. Apparently not as serious as last year, but causing considerable loss in many fields. Improved methods of controlling striped beetles are reducing the amount of this disease. (Nelson)

Ohio: The bacterial wilt is probably the most serious disease on cantaloupes this season, and especially in the northwestern part of the state where it is causing serious loss. In some places the loss is as high as 40 per cent of the crop. (H. C. Young)

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was very destructive in Ohio, Michigan, and Iowa (estimated loss 10 per cent) in 1925. Other states from which it was reported are New York (estimated loss a trace), Maryland (estimated loss a trace), southern Georgia (estimated loss 5 per cent), Florida, Wisconsin, and Kansas. Collaborators' reports from Florida, Ohio, and Michigan are as follows:

Florida: Found almost everywhere the host plant is grown in the state, worst in northern part of the state. (Weber)

Ohio: Next to the bacterial wilt, anthracnose is causing serious losses in the melon growing section around Cleveland. It is a disease that has been very common there for the last few years but seems to be more destructive this year, and in some places the crop will be reduced by 20 to 30 per cent. (H.C. Young)

Michigan: Second most important melon disease. Generally reported as blight and very much confused with leaf blight, caused by Macrosporium. More than usual amount of this disease and very important in some fields. Seed borne. (Nelson)

DOWNY MILDEW CAUSED BY PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

Downy mildew was reported from Delaware, Maryland (estimated loss 1.5 per cent), South Carolina, southern Georgia (estimated loss 1 per cent), Florida, Texas (loss 3 per cent), California (loss 2 per cent), and Porto Rico Delaware, Maryland and south Georgia reported less than last year and less than average years. Other reports from collaborators are:

South Carolina: Found to limited extent throughout trucking district but in no case was severe damage done. (Moore)

Florida: Downy mildew is probably the worst disease in Florida on cantaloupe. It was found wherever the host plant was grown and did considerable damage. (Weber)

California: Downy mildew has been very destructive in the coastal regions of San Diego County for the past four years. Growers and local agricultural authorities state that cantaloupes and watermelons were grown very successfully prior to 1922 without trouble from downy mildew, high quality melons being supplied to local and nearby markets from June until October. In 1922 mildew became generally destructive late in the season; in 1923 it became destructive in August; in 1924 it was first observed on June 23 and soon became general; in 1925 early stages were noted on July 12, and by July 22 many fields showed marked defoliation. Decided reductions in yields have resulted. Even more decided has been reduction in quality and consequent disrepute of local melons, outside of the earliest melons harvested before mildew became destructive. (Jagger)

MOSAIC (UNDETERMINED)

States from which mosaic was reported in 1925 were Connecticut, New York, Delaware, Maryland, Virginia, Kentucky, Indiana, Iowa, and Kansas. In Iowa the loss was estimated at 5 per cent. Other states report it not serious or serious only locally. The following are some of the collaborators' reports on the occurrence and severity of mosaic.

New York: In the Irondequoit - Greece Section a trace to 3 per cent of the plants showed very evident mosaic symptoms; mottled, roughened leaves, and the plants dwarfed and yellowed. In each case the plant was a complete loss. (Chupp)

Mosaic common, 5 per cent or more in a field at Elmira, New York. (Barrus)

Maryland: The most important disease evident was mosaic, which was found in 17 out of 21 fields examined. In general not more than a trace was present, but in one field about 50 per cent, in another 10 per cent, and in two others 1 per cent were affected. In three of the worst fields the relation of pokeweed (Phytolacca) to mosaic of cantaloupe was closely demonstrated, most of the diseased plants being on the sides of the field near the infected pokeweeds. (Jehle, Gilbert, & Haskell)

Kentucky: At Middletown two fields were plowed under because of nearly complete infection with mosaic. Milkweeds were in the woods in the near vicinity. (Gardner)

POWDERY MILDEW CAUSED BY ERYSIPHE CICHORACEARUM DC.

Two serious outbreaks of powdery mildew were reported in 1925, one in southern Georgia and the other in the Imperial Valley of California. It was also reported from Delaware and Florida, but was not considered serious in those states.

Georgia: Powdery mildew entailed more loss outside the commercial fields than any other disease this year, principally to small truck and garden patches of later plantings. In some fields, losses ran as high as 50 per cent. Of little consequence in the earlier large plantings. First noted June 15 on isolated hills in small fields, but by July 1 had spread over wide areas in fields.

Loss, 1 per cent in commercial fields, and about 15 per cent in the garden and truck patches, principally on Rocky Ford. (Boyd)

California: A large acreage of early cantaloupes is grown in the Imperial Valley of California, where the climate is decidedly arid with an average annual rainfall of about 3 inches and a very high percentage of sunshine. Previous to 1925 there had been no complaints of injury to foliage by the various fungi and bacteria which attack the leaves in moister climates. Powdery mildew appeared in the 1925 crop early in May, when harvesting was about to begin in the earliest fields. Invariably there was no foliage injury and little mildew to be found until melons began to ripen, but in practically every field in the Valley mildew appeared in destructive form at about the time picking began, and developed rapidly thereafter. The older leaves were killed rapidly, resulting in the failure of later set melons to develop, and undoubtedly in reduced quality, especially of fruits picked after the foliage had been much reduced. Local interests are agreed that mildew reduced the total crop of the Valley about 15 per cent. Perithecia of the mildew fungus have not been found, making it impossible to definitely classify it, although Erysiphe cichoracearum DC. is usually indicated on cucurbits. (Jagger)

OTHER DISEASES

Heterodera radicicola (Greef)Muell. (Caconema radicicola (Greef) Cobb), rootknot, was reported by Boyd as "Quite important in both the commercial fields and small gardens in the coastal plain area of southern Georgia; caused a loss of 10 per cent." It was also reported from Florida, Texas, Oklahoma, and Missouri where it is reported to be serious in local areas.

Fusarium sp., wilt. Much injury was reported in a few fields in Monroe and Niagara Counties, New York, by Chupp who states that "Infected plants at first are yellow and stunted, later wilt and die. Brown vascular bundles."

Cercospora cucurbitae Ell. & Ev., leafspot. Georgia, Porto Rico.

Cladosporium cucumerinum Ell. & Arth., scab. Reported from the Irondequoit and Schenectady districts in New York.

Phyllosticta sp., leafspot, was reported from southern Georgia.

Sclerotium rolfsii Sacc., stemrot, Texas, stemrot and fruitrot, Georgia.

Septoria cucurbitacearum Sacc., leafspot, was collected in Michigan by C. W. Bennett.

Bacterial leafspot (undet.). Reported from Georgia.

Bordeaux spray injury was reported from Connecticut, but was of little importance.

CUCUMBER

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

In 1925 bacterial wilt was reported from seventeen states east of the Great Plains. The largest losses reported were 20 per cent from Kentucky and 10 per cent from West Virginia. Other estimated losses were, Iowa 5 per cent, New York 3 per cent, and Texas one-half per cent.

New York: In a demonstration at Ithaca on wilt control, 12 plats were planted, so that there were four replications.

1. Dusted 6 times: Copper-lime lead-arsenate dust. Yield 261.75 pounds.
2. Dusted 6 times: 3 times with nicotine dust, 3 with copper-lime lead-arsenate. Yield 213.50 pounds.
3. Check, no treatment: Yield 190.50 pounds.

The check plats that had no wilt yielded as well as the dusted, but the wilt in two check plats reduced the yield very much. (Chupp)

Kentucky: July 2 and 3 I visited several fields of cucumbers near Harned in Breckenridge County. In the early plantings close to 20 per cent of the plants were already infected with wilt. Many plants had already died. Three per cent nicotine dust had been used, but was put on at weekly intervals. (Valleau)

Ohio: It is difficult to find a planting of cucurbits where there is not some evidence of the bacterial wilt disease. Contrary to usual symptoms, this disease does not appear to be started by infection of the stem at the surface of the ground. The number of leaf infections noted this season has been large compared with other seasons. It may be safely estimated that 90 per cent of the cucumber plantings in northern Ohio show varying amounts of the bacterial wilt trouble. (Report of Plant Pathologists, Ohio Agr. Exp. Sta. for Northern Ohio, August, 1925.)

Michigan: Our early predictions as to the occurrence of wilt were not borne out due to onset of unfavorable conditions for striped beetles. Less important than for several years. (Nelson)

ANGULAR LEAFSPOT CAUSED BY BACTERIUM LACHRYMANS EFS. & BRYAN

Angular leafspot was reported from New York, Delaware, Georgia, Florida, Michigan, and Wisconsin in 1925. In New York it was again reported from Monroe County. Last year was the first time it was observed in that state outside of the Long Island section.

Delaware: Most important leaf disease. (Adams)

Florida: This disease was not as prevalent during the past season as the year before. It was important, however, in the Williston section where it did considerable damage. (Weber)

Michigan: Caused considerable alarm early in the season, but was not generally important. Some fields grown for seed were badly diseased. Seed treatment reported ineffective. (Nelson)

Wisconsin: More than for several years. (Vaughan)

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was reported from New York, Delaware, Maryland, Georgia, Florida, Mississippi, Indiana, and Iowa. No serious injury was reported.

MOSAIC (UNDETERMINED)

Judging from reports of collaborators, mosaic was one of the most important cucumber diseases in 1925. It was reported from Massachusetts, Connecticut, New York, New Jersey, Maryland, Virginia, Indiana, Michigan, Wisconsin, Iowa, and Kansas. In New York the loss from mosaic on Long Island is estimated at 65 per cent.

In a survey conducted by Doctors Jehle, Gilbert, and Haskell a number of cucumber and cantaloupe fields on the eastern shore of Maryland were inspected. In a field of cucumbers in Wicomico County practically every plant had been attacked by mosaic. It was noted that the most severely infected plants were all located in the part of the field adjoining a piece of woodland and that the infection was least severe in the portion of the field farthest away from the wood lot. In the wood lot several large pokeweeds (Phytolacca) severely infected with mosaic were found not far from the most severely infected cucumber plants. It seems reasonable to conclude that the mosaic was transmitted to the cucumber plants by means of insects from the infected pokeweeds and was then disseminated throughout the field.

According to Nelson, "Mosaic has assumed serious proportions as a destructive disease in the pickling crop" in Michigan. He states that "Pickle companies report very serious losses this year and the disease is yearly on the increase." The losses are estimated by him at 20 to 40 per cent.

The potential importance of perennial species of Physalis as a means of overwintering cucurbit mosaic has been demonstrated by Walker (6). He reports that a mosaic infection found to be common on and overwintering in _P. subglabrata_ and _P. heterophylla_ in the vicinity of cucumber fields is communicable to cucumber, by means of the cucumber aphis, and also to _P. pubescens_, an annual species; also that the mosaics of cucumber and _P. pubescens_ are readily intertransmissible by means of the cucumber aphis; and that the mosaic diseases of pokeweed, tobacco, and tomato can be transmitted to _P. pubescens_.

Doolittle and Walker (1) report that the wild cucumber (_Micrampelis lobata_) is apparently an important factor in overwintering mosaic in the cucumber growing sections of Wisconsin and Illinois, due to seed transmission, which had been demonstrated previously by Doolittle and Gilbert (2). Other plants which have been found to be susceptible to cucurbit mosaic and to carry infection through the winter in their roots are milkweed (_Asclepias syriaca_), pokeweed (_Phytolacca decandra_), catnip (_Nepeta cataria_), and certain perennial species of Physalis. _Martynia louisiana_, pigweed (_Amaranthus retroflexus_), and pepper (_Capsicum annuum_) were inoculated successfully with virus from mosaic cucumbers. Pepper plants were infected with tobacco mosaic and the disease then transmitted to either tobacco or cucumbers, and the reverse inoculation was also successful, indicating that the viruses of tobacco and cucurbit mosaics are intertransmissible. Among the Cucurbitaceae all species tested proved to be susceptible to cucurbit mosaic except those of the genus Citrullus.

Elmer (3) reports successful transmission of mosaic from cucumber to tobacco, petunia, and Vigna sinensis, and to cucumber from celery and Euphorbia preslii.

Recent literature:

1. Doolittle, S. P., and M. N. Walker. Further studies on overwintering and dissemination of cucurbit mosaic. Jour. Agr. Res. 31: 1-58. July 1, 1925.

2. -----------, and W. W. Gilbert. Seed transmission of cucurbit mosaic by the wild cucumber. Phytopath. 9: 326-327. Aug. 1919.

3. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

4. Hansen, A. A. Controlling diseases by destroying weeds. Better crops. 4 (4): 22-23, 28-29. June 1925.
   Eradication of milkweed, pokeroot, and wild cucumbers.

5. Leach, J. G. Cucumber mosaic. Minn. Hort. 53: 177-179. June 1925.

6. Walker, M. N. The relation of certain species of Physalis to the overwintering of the mosaic disease of cucumber. Phytopath. 15: 733-744. Dec. 1925.

DOWNY MILDEW CAUSED BY PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

In 1925 downy mildew was reported from six states along the Atlantic seaboard from Massachusetts to Florida, and from Louisiana and Porto Rico. The largest losses are reported from Florida and southern Georgia. Weber states that in Florida this disease was by far the most important found on cucumbers. It was the limiting factor on the picking season, although not as serious as last year, and it caused a loss of 10 to 15 per cent. It kills the host plant wherever or whenever it grows in the state. In southern Georgia Boyd estimated the loss at 5 per cent and reported the disease to be generally slight, but causing heavy losses in some late fields.

SCAB CAUSED BY CLADOSPORIUM CUCUMERINUM ELL. & ARTH.

Scab was reported only from Maine, New York, Michigan, and Wisconsin, but they all report it to be more destructive than usual. The following loss estimates were given: Michigan, 5 to 10 per cent; Wisconsin, 2 per cent; New York, a trace to 2 per cent.

Maine: Disease apparently much worse than usual. (Folsom)

Michigan: Scab was very troublesome this year, especially on late crop. Salting stations had to refuse to accept quite a large proportion of the crop in some sections. (Nelson)

New York: Occurs both in the greenhouses and outdoors. Seems to be increasing in amount. (Chupp)

Wisconsin: More reports than ever before. One man writes of losing 100 acres in Outagamie County. Cucumbers about village gardens badly diseased in Trempealeau County. We need more research on this disease. (Vaughan)

OTHER DISEASES

Erysiphe cichoracearum DC., powdery mildew, was noted in greenhouses in Massachusetts and Virginia, and was reported also from Delaware, southern Georgia, and Washington. Regarding its occurrence in southern Georgia Boyd states, "It appeared late in the season (June 18) and blighted the foliage after the bulk of the crop was marketed. As much as 5 to 10 per cent loss in a few late fields and gardens. Estimated loss for the state 2 per cent."

Heterodera radicicola (Greef) Muell. (*Caconema radicicola* (Greef) Cobb), rootknot, was reported from New York (greenhouse), southern Georgia, and Texas. Boyd estimated a loss of 10 per cent in southern Georgia where there was a rapid development of the disease after the break in the drought about June 15. The estimated loss in Texas was one per cent.

Alternaria sp., leafspot, was reported from South Carolina by Moore, who said one field was noted in Chesterfield where the foliage was seriously damaged. Not general.

Cercospora sp., leafspot. Southern Georgia.

Cercospora cucurbitae Ell. & Ev. (*C. citrullina* Cke.), leafspot. Collected in Florida after the picking season on cucumbers grown under glass, not important. (Weber)

Fusarium niveum EFS., wilt. Regarding Fusarium wilt in Florida Weber says, "Reported to be doing some damage to the host plant growing under glass. Not common."

Macrosporium cucumerinum Ell. & Ev., leafblight, was reported from southern Georgia and Maryland.

Phyllosticta cucurbitacearum Sacc., leafspot, was reported from Delaware by Adams, who said "First observation. Trace of infection found only in one field."

Pythium sp., fruit rot. Southern Georgia.

Pythium aphanidermatum (Edson) Fitz., causing cottony leak, is reported by Drechsler (1) as having been found in cucumber shipments originating in North Carolina and South Carolina.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot. New York and Washington in greenhouses; fruit rot (2) southern Georgia.

Sclerotium rolfsii Sacc., ground rot. Reported from southern Georgia.

Bacterial leafspot. A bacterial leafspot (undet.) was reported from southern Georgia.

Recent literature:

1. Drechsler, C. The cottony leak of cucumbers caused by Pythium

aphanidermatum. Jour. Agr. Res. 30: 1035-1042. June 1, 1925.

2. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

PUMPKIN

Fruit rot caused by Alternaria sp. was reported from Washington.

Bacterial wilt caused by Bacillus tracheiphilus EFS. was reported from Lawrence County, Illinois.

Powdery mildew probably Erysiphe cichoracearum DC. was reported from Oregon.

Black rot caused by Mycosphaerella citrullina (C. O. Sm.) Gross. was reported from Michigan. Nelson stated that "One 80-acre field was reported a total loss."

SQUASH AND SUMMER SQUASH

Powdery mildew caused by Erysiphe cichoracearum DC. was reported from Connecticut, New Jersey (on Hubbard and Italian squash; generally distributed); southern Georgia (little, except on some late plantings, loss 5 per cent), Florida (found well scattered over the state, but doing little damage), Oregon (on Boston Marrow, local in western part of state.).

Angular leafspot caused by Bacterium cucurbitae Bryan, was found on Hubbard squash in one garden in Tompkins County, New York. The disease resembled very strongly the angular leafspot of cucumbers, but according to Miss Bryan it is due to a different organism which she has named Bacterium cucurbitae (1).

Mosaic (undet.) was reported from Florida on Cucurbita pepo and C. moschata. Weber stated that it was very common and caused total loss in some fields of the former species. In Arizona, according to Streets, the disease is probably more general and destructive than is realized. He estimated a loss of 5 per cent. Mosaic was reported from Louisiana and Texas.

Elmer (2) reports successful infection of tobacco, petunia, tomato, and cowpea with virus from summer crookneck squash (Cucurbita pepo condensa) plants affected with mosaic; and of the squash with virus from mosaic tobacco and tomato plants.

Downy mildew caused by Pseudoperonospora cubensis (Berk. & Curt.) Rostow. was said by Weber to be common and the cause of considerable loss on summer squash in Florida.

Anthracnose caused by Glomerella sp. According to Ocfemia and Agati (3) a Glomerella attacks the stems, leaves and fruit of the white squash (Cucurbita pepo) in the Philippines. It is very similar to, if not identical with

Glomerella cingulata causing anthracnose of avocado and mango, and is capable of infecting those hosts. It is a serious disease in the Philippines.

Bacterial wilt caused by *Bacillus tracheiphilus* EFS. was reported from Connecticut, New York (on *Cucurbita maxima*), and Delaware (on summer squash), A specimen was received from Indiana.

Rootknot caused by *Heterodera radicicola* (Greef) Muell. (*Caconema radicicola* (Greef) Cobb), was general in the Coastal Plain of southern Georgia where it caused a loss estimated by Boyd at 10 per cent. It was also reported from Texas.

Blossom rot caused by *Choanephora cucurbitarum* (Berk. & Rav.) Thax. was reported as occurring on summer squash in Delaware and Florida.

Wilt caused by *Fusarium* sp. was reported from Delaware and Texas.

Timber rot caused by *Sclerotinia sclerotiorum* (Lib.) Mass. was reported from New York (on *Cucurbita maxima*; rare).

Rots caused by *Aspergillus* sp., *Botrytis cinerea* Pers., and *Rhizopus nigricans* Ehr. were reported from Washington.

Soft rot (undet.) was reported to be common on cymblings in the Norfolk region of Virginia by McWhorter.

Recent literature:

1. Bryan, Mary K. Bacterial leafspot on Hubbard squash. Science n.s. 63: 165. Feb. 5, 1926.

2. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

3. Ocfemia, G. O., and J. A. Agati. The cause of the anthracnose of avocado, mango, and upo in the Philippine Islands. Philipp. Agr. 14: 199-216. Sept. 1925.

WATERMELON

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was the most destructive watermelon disease in 1925. Serious losses were reported from Iowa, southern Georgia, Florida, and Mississippi. Other states reporting it were New York, New Jersey, Delaware, Maryland, South Carolina, Louisiana, Ohio, Indiana, Kansas, and Porto Rico. The following are some of the loss estimates for 1925: Iowa 20 per cent, southern Georgia 10 per cent, Maryland 8 per cent, Indiana 2 per cent.

Georgia (southern): Although the temperature was favorable for development, moisture relationships were not favorable for epidemics; also although pox was plentiful on melons entering cars, moisture conditions during transit apparently were not conducive to anthracnose rot, for there was much less transit rot than usual. (Boyd)

Florida: The worst disease of the host in the state. It was common over the state and was about as abundant and serious as last year. (Weber)

Mississippi: Several reports this season. Serious damage in many cases. Evidently the disease is being imported and spread largely in the seed. (Neal)

Ohio: Considerable loss in the state from the anthracnose disease. It seems to be increasing from year to year. (Young)

Kansas: By far fewer reports this year than ever before. (White)

Recent literature:

1. Boyd, O. C. Spraying and dusting watermelons for anthracnose control. Proc. & Min. Melon Distr. Assoc. Ann. Meet. 11 (1925): 30-33. 1925.

FUSARIUM WILT CAUSED BY FUSARIUM NIVEUM EFS.

Fusarium wilt was reported from New Jersey, Maryland, South Carolina, Georgia, Florida, Mississippi, Texas, Indiana, Iowa, Missouri, Kansas, Arizona, Oregon, and California. The following losses were reported in 1925 - Kansas 5 per cent, California 2 per cent, southern Georgia one percent, Maryland a trace.

Georgia (southern): General in Coastal Plain, but most prevalent in southern counties. In infested soil, it developed in spite of drought; temperature favorable. (Boyd)

Florida: Bad in localities or on land where crop was not rotated. Generally distributed, about as much as last year. (Weber)

Mississippi: The disease was very prevalent in various parts of the state during July and August, causing serious damage in Lee, Choctaw, Lauderdale, and Attala Counties. (Neal)

Oregon: One field of 50 or 60 acres on Grand Island (in the Willamette River near Dayton) showed wilt due to *Fusarium* sp. varying from 50 per cent in spots to none in other parts. It was on newly cleared land, which lay below the melon fields of 1923, and flood water drained over it. The wilt was worse in the places where flood water stood in the winter. There is a good deal of land in western Oregon suitable for melon growing, and there would be a much larger acreage if it were not for wilt. The varieties that have been developed as resistant in the East have not, on trial, proved to be so here. No control has been developed. Growers believe hill lands are safer and some are going to grow melons there as a trial. (McKay)

GUMMY STEMBLIGHT CAUSED BY MYCOSPHAERELLA CITRULLINA (C. O. SM.) GROSS.

Gummy stemblight was reported from Georgia, Florida, and Porto Rico. The following reports were received from Georgia and Florida.

Georgia: First observed May 25 in the station field. Generally less common than in 1924. Most prominent where melons were planted one to 2 years after melons. Highest percentage infection, 10 per cent with a loss of 2 per cent of the hills before shipping season was half over (5-acre field, Thomas County). Estimated loss, one-half per cent. (Boyd)

Florida: Frequently found during the past season girdling and killing bearing vines. (Weber)

OTHER DISEASES

Blossom-end rot. In southern Georgia the estimated loss from blossom-end rot was 10 per cent. According to Boyd the dry weather with heavy dews promoted the rot and the temperature was favorable. In Iowa and Texas the loss from this disease was estimated at 2 per cent. It was also reported from Virginia.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) rootknot, Boyd reported that in southern Georgia, "Rootknot is general in the Coastal Plain but worse in the southernmost counties. It was important only in fields on old land. Loss 5 per cent." Taubenhaus reported a loss of one-half to one per cent in Texas.

Cercospora cucurbitae Ell. & Ev. (C. citrullina Cke.), leafspot, was reported from southern Georgia, Florida, and Texas.

Erysiphe cichoracearum DC., powdery mildew. Georgia.

Diplodia sp., stem-end rot. Maryland, southern Georgia, Louisiana, Texas.

Macrosporium cucumerinum Ell. & Ev., leaf blight. Virginia, Georgia, and Florida.

Phyllosticta cucurbitacearum Sacc., leafspot. Georgia.

Pseudoperonospora cubensis (Berk. & Curt.) Rostew., downy mildew. Louisiana, infection light as a rule, but considerable injury to some late plants, according to Edgerton.

Rhizoctonia sp. A Rhizoctonia stemrot of seedling was reported from Georgia.

Sclerotium rolfsii Sacc. In Georgia the estimated loss from fruitrot was one per cent. Stemrot was reported as common in Florida.

Mosaic (undet.) Collaborators in Virginia, Indiana, and Texas reported a mosaic-like trouble. Workers with cucurbit mosaic have not been able to obtain infection of species of Citrullus. (See cucumber)

Recent literature:

1. Anon. Prevent stem-end rot of melons in transit. Citrus Indust. 6 (6): 14. June 1925.

2. Gilbert, W. W., and Ernst Artschwager. Watermelon internal browning. Phytopath. 15: 119-121. 1925.

3. ---------, and F. C. Meier. Chemical injury to watermelons in transit. (Abstract) Phytopath. 16: 73. Jan. 1926.

4. Ramsey, G. B. Fumigation injury of watermelons. Phytopath.15: 479-481. 1925.

DISEASES OF CELERY

BACTERIAL BLIGHT CAUSED BY BACTERIUM APII JAGGER

Bacterial blight was reported from New York (estimated loss 2 to 3 per cent), Ohio, Michigan (estimated loss 2 to 5 per cent), and Minnesota. In Michigan Nelson reported, "Bacterial blight was generally present in all fields in Kalamazoo and destructive in the second crop. It was more important than Septoria except at Kalamazoo and Muskegon." Chupp reported that in New York, "It is of minor importance where control measures are exercised. Good control was obtained with copper-lime dust and Bordeaux. Most of the infected fields outgrew the trouble and it was not severe after August 15."

EARLY BLIGHT CAUSED BY CERCOSPORA APII FRESENIUS

Early blight was reported from New Hampshire, Connecticut, New York, New Jersey, Delaware, Florida, Texas, Indiana, Michigan, Missouri, Nebraska, and California in 1925. In most of the states it was considered to be relatively unimportant, but a loss of one to 5 per cent was reported from Michigan and one per cent from California. In Connecticut there was more than usual and together with late blight it caused much injury. In Florida it still remains the most common disease of celery, according to Weber, and commercial control was obtained by spraying, while unsprayed plants were a total loss. In Michigan, Nelson stated "Generally found everywhere but important only in the second crop in the Kalamazoo district. It was not well controlled by dusting but spraying was effective."

YELLOWS CAUSED BY FUSARIUM SP.

New York, Ohio, Indiana, Michigan, Minnesota, and Colorado reported yellows in 1925. In New York it seems to be increasing in importance, according to Chupp, who estimated the loss at a trace to 2 per cent. Some of the other reports received are as follows:

Indiana: Not serious. Growers near Goshen and Lafayette use resistant varieties. Seed from Coons and Nelson, Michigan, proved resistant. (Gregory)

Michigan: Of minor importance. The general use of strains originating from crosses with "green" varieties has largely eliminated yellows as a factor in the production of celery in the infested areas. (Nelson)

Minnesota: Observed in one field near St. Paul. One spot which is increasing in size each year. (Sect. Plant Path.)

LATE BLIGHT CAUSED BY SEPTORIA APII ROSTR.

Late blight was one of the most serious diseases of celery in 1925. It was reported from the following states: New Hampshire, Massachusetts, Connecticut, New York, New Jersey, Florida, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Colorado, California, and Porto Rico. Losses reported were 10 to 15 per cent in Michigan, 10 per cent in New York, and 2 per cent in California. Bisby stated that it caused some injury in Manitoba, Canada.

Massachusetts: Has appeared both in the seed bed and the field in Amherst. The field infection undoubtedly came from the seedbed on early celery and appears to be rather serious. So far as we have record, this - May 16 - seems to be the earliest appearance of this disease reported in Massachusetts. (Osmun)

Connecticut: Considerably more than the average year and the worst seen for several years. With a good start and considerable injury, the cold weather of October slowed up the spread very considerably. Injury runs all the way from slight to 40 per cent according to variety and field. (Clinton)

New York: Where seedbeds were dusted with copper lime dust three times, the disease was much more easily held in check after the plants were transplanted. Much early celery escaped blight, harvested early. (Chupp).

New Jersey: Not a serious trouble on properly sprayed plants. (Dept. Plant Path.)

Florida: More plentiful than last year in the state at large with probably less in the Sanford section. (Weber)

Michigan: Fifty per cent loss in late crop in Kalamazoo district; 25 per cent in Muskegon district. Elsewhere, in one-crop sections, controlled by spraying and dusting. (Nelson)

Wisconsin: More than usual. Many plants had one-third of the outer leaves destroyed. Hearts were sold just the same, growers considered it of little damage. (Vaughan)

Minnesota: Several severe outbreaks in some fields planted from a lot of seed known to be badly infected. Other fields comparatively free. (Sect. Plant Path.)

California: Occurred considerably in central California. This is unusual. (Milbrath)

OTHER DISEASES

Bacillus carotovorus Jones, slimy rot. Connecticut, Minnesota, Iowa, and Colorado. In Minnesota the Section of Plant Pathology reported,

> "Severe outbreaks in some fields; one field of one-fourth acre a total loss. Worse in dry hot weather. Worse on some plants differing only in date of planting. Seems to be correlated with lack of rains and age of plants at critical time. Evidence of insect transmission."

Corticium vagum Berk. & Curt., rootrot. Chupp reported this from New York as follows:

> "At South Lima, Livingston County, a muck field which later was planted to celery, was in part heavily mulched with old, decaying potatoes from the storage house. After the celery grew to be about ten inches tall, the Corticium stage of Rhizoctonia fruited over the entire surface of many of the plants grown in the mulched area. The cuticle slipped off the covered parts of the stem and some of the stem tissue turned brown.
>
> "It is not known whether the Corticium was originally in the soil or whether the sclerotia on the decaying tubers could have been the cause of the trouble."

Sclerotinia sclerotiorum (Lib.) Mass. (2), pink rot. New York, Florida, Washington, California. In New York it was mostly a rot in storage. In Florida it was one of the worst diseases of celery, taking heavy toll in the fields before harvest time and also in transit. In California foot rot due to this organism caused a loss of one-half per cent, according to Milbrath.

Heterodera radicicola (Greef) Muell. rootknot. Florida, "More serious during the fall in seedbeds than last year." (Weber)

Blackheart (non-par.). California.

Crown rot (undet.). Reported from New York. A bacterium was isolated from material sent to Chupp.

A burning off and water injury were reported from New York. The burning off was due to excess heat from the sun and the water injury to excess rain and poor drainage. The latter produced blackened and water-soaked stems and was serious in Wayne County. The former was serious in many seedbeds.

Mosaic (undet.) was reported from New York, Ohio, Iowa, California, Elmer (1) obtained infection of tomato, tobacco, and cucumber with celery mosaic.

Recent literature:

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res Bul. 82: 39-91. 1925.

2. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

DISEASES OF LETTUCE

DROP CAUSED BY SCLEROTINIA SCLEROTIORUM (LIB.) MASS. AND S. MINOR JAGGER

Sclerotinia sclerotiorum occurred in greenhouses in Massachusetts and Indiana, and in New York it was most important in greenhouses but was also found in the field. Chupp estimated a loss of 5 per cent. Other states reporting its occurrence in the field are Connecticut, Virginia, Florida, Louisiana, Washington, and Oregon. In Louisiana and western Oregon the disease was said to be serious locally. Weber reported that in Florida, "Drop was probably not so prevalent and serious during the past season as the year before. Nevertheless it still remains foremost in importance of lettuce diseases, causing as much loss as all others combined." In California, according to Milbrath, the disease was present throughout the state, except in the Imperial Valley, and caused a loss estimated at one-half per cent.

Sclerotinia minor was reported from western Oregon as important where it occurred, and from New Jersey as very severe in some fields.

Recent literature:

1. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

DOWNY MILDEW CAUSED BY BREMIA LACTUCAE REGEL

Downy mildew was reported from New York, South Carolina, Florida, Indiana, Iowa, Washington, and California, and in most cases considered relatively unimportant. In New York it developed into a storage and transit rot; in Florida it was common but seldom destructive; in Indiana and Iowa it occurred in greenhouses. In California there was considerable outside of the Imperial Valley, in all the coastal regions and northern valleys, and it caused a loss of 2 per cent, according to Milbrath.

GRAYMOLD CAUSED BY BOTRYTIS SP.

Massachusetts, Connecticut, New York, New Jersey, Virginia, and Iowa reported graymold in 1925. In Massachusetts and Iowa it occurred in greenhouses; in New York it was statewide and caused a loss estimated by Chupp at a trace to one per cent; in New Jersey it was said to be important in some coldframes, and preliminary tests indicated that it could be controlled by organic mercury compounds.

BOTTOM-ROT CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Bottom-rot, always an important disease in New York, caused a loss of 15 to 20 per cent in 1925, according to Chupp and Felix. It was also reported from Connecticut. White reported a rootrot from Kansas as follows, "One case only has come to my attention this year. The cause is probably Rhizoctonia sp. since this organism has been associated with a field root-rot in previous years in this state. No specimens accompanied the report, however."

TIPBURN (NONPAR.)

Tipburn seemed to have been especially destructive in some of the Atlantic Coast states in 1925. Chupp and Felix reported that it was general and serious in New York and caused a loss estimated by them at 15 per cent. Internal tipburn was prevalent. In one field of 10 acres observed in New Jersey every plant was ruined by tipburn, according to the Department of Plant Pathology. In that state the disease was said to be most severe in the southern part. McWhorter reported from the Eastern Shore of Virginia in the spring of 1925 that, "There is a very large amount of tipburn in the Newport News and Portsmouth lettuce sections. The disease is apparently worse in sections where a great deal of crab-scrap fertilizer was used. It appeared after several warm days in the spring." Boyd stated that tipburn was very common throughout southern Georgia on both leaf and head lettuce during April and May, and quite destructive in some gardens and fields.

In the western states, the disease was said to be unimportant in Idaho; on the other hand, tipburn, followed by slimy rot, was of some importance in Oregon; while in California, Milbrath reported a loss of 3 per cent.

BACTERIAL DISEASES

Leafspot caused by Bacterium marginale Brown (?), reported in one field in Wayne County, New York, in July; 50 per cent infection. (J. G. Gaines)

Rot caused by Bacterium viridilividum Brown, apparently following tipburn, was reported by McWhorter from the Eastern Shore of Virginia.

Wilt caused by Bacterium vitians Brown was reported from New York.

Bacterial stem girdle (undet.). Felix reported this from New York as follows: "More than last year. Occurred in Genesee, Orleans, Oswego, and Wayne Counties, and possibly wherever lettuce is grown. Infection begins at the surface of the ground and works downward."

A leafspot, undetermined but apparently bacterial, was reported by Felix from Genesee and Orleans Counties, New York. All varieties were attacked, but Dye's hybrid 26-19-10 (Big Boston x Cos) was unusually susceptible.

An undetermined bacterial leaf spotting, wilting, and yellowing was reported from San Miguel and Dona Ana Counties, New Mexico.

Bacterial softrot. Rotting off of the plants at crown in Iceberg variety was reported from Connecticut. Softrot was also reported from Oregon, (following tipburn), Washington, and Idaho. Arizona reported a bacterial slime as follows:

> "Lettuce slime has developed in many of the late plantings throughout the Salt River Valley. This disease evidently was associated with the high temperatures prevalent for several days. Some fields were so badly diseased that shipment was out of the question although much could be used for local consumption." (The Arizona News Letter, State Com. Agr. & Hort. 3: 7. April 30, 1925.)

MOSAIC (UNDETERMINED)

In New York there was more mosaic than last year and more than average, the loss being estimated at 15 per cent by Chupp and Felix. They state that mosaic is carried in the seed and spreads later, also that the growers believe it is becoming more serious only since large quantities of seed have been obtained from California. The Survey has no record of the occurrence of lettuce mosaic in California, but it very likely is present in that state. It has been found causing considerable damage in the lettuce section of Florida, especially during the past season or two. In New Mexico more than last year, and more than the average amount was reported, with an estimated loss of 2 per cent

RIO GRANDE DISEASE (UNDETERMINED)

Rio Grande disease is considered one of the most important diseasesof lettuce in western New York, where it is known as white heart. The loss for 1925 is estimated by Chupp and Felix at 10 per cent. They state that the disease is present on both muck and upland soil, and occurs under so many differen environmental conditions that it is believed not to be a physiological trouble. Traces are reported from the Rio Grande Valley of Texas. McWhorter, in Virgini again reported a rosette-like disease, probably the initial stages of the one which he tentatively called the "Newport News rosette" in 1924, but which was said to resemble the Rio Grande disease.

BROWN BLIGHT (UNDETERMINED)

This new lettuce disease is described by Jagger from California and Arizona as follows:

> "Brown blight is a new disease of lettuce, apparently caused by a soil organism, which, however, has so far not been fully identified. When attacked while small the plants become much stunted, show yellow to brown discoloration, and gradually

die; when attacked after headed the wrapper leaves and the outer leaves of the head show irregular dry dead brown streaks and blotches. It is destructive in the Imperial Valley of California and is known to occur in several localities in Arizona. In the Imperial Valley it occurs in all fields but usually becomes destructive only after one to three crops of lettuce have been grown. The disease is not materially reduced by growing other crops on infested land for one to four years, notwithstanding the fact that only lettuce seems to be affected. Probably the average loss for the Valley for the past 3 or 4 years has been somewhere between 1 and 5 per cent, and the best lettuce land is rapidly becoming infested beyond possibility of growing satisfactory crops for many years. The writer is making rapid progress in developing highly resistant strains of the New York variety (known to the consumer as Iceberg), which is grown almost exclusively in Pacific Coast and Rocky Mountain regions. Incidentally the Big Boston variety, which is the standard shipping variety in the South and East, seems to be entirely immune."

OTHER DISEASES

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), rootknot. Reported in greenhouses in New York, Arkansas, and Indiana. A 5 to 10 per cent infection was observed in one field in New Jersey. In Georgia it was common in home gardens but less destructive than in 1924.

Sclerotium rolfsii Sacc., damping off was reported as moderate to severe in the Coastal Plain area of South Carolina where truck crops, especially lettuce, have been grown continuously, and causing a loss estimated at 15 per cent.

Cercospora lactucae Stevenson, leafspot, Porto Rico.

Macrosporium sp., blight, was reported as occurring to a slight extent in New York, causing a loss estimated at one per cent.

Marssonina panattoniana (Berl.) Magn., anthracnose, general in Florida.

Ozonium omnivorum Shear, rootrot, was said to be prevalent in overgrown lettuce in Texas.

Septoria lactucae Pass, leafspot. New York.

Chlorosis due to excess of lime, Texas.

Rootrot (undet.). Considerable in some fields in New York and more prevalent than last year, according to Felix.

Stunt (undet.) was found, mostly on Cos lettuce, on 18 farms visited in New York, infection ranging from a trace to 2 per cent. Chupp states that Felix thinks this is bacterial in nature, instead of being due to a Pythium.

Stunting of plants on unproductive muck, involving several hundred acres, was reported from New York, where it occurred in Genesee, Orleans, and Oswego Counties, and probably others also, according to Felix. The plants were stunted and had a "rabbit ear" appearance. Felix stated that "Small applications of copper to the soil or to the leaves of affected plants corrected the unproductivity. Onions and rutabagas are also very sensitive to the trouble; while potatoes and certain other crops do well without treatment. This type of unproductivity is distinct from that caused by toxic elm wood. (See onion)."

Stunting due to soluble salt injury was of statewide occurrence in greenhouses in Indiana, according to Gregory.

Recent literature:

1. McWhorter, Frank P. Cercospora leaf spot of lettuce. Phytopath. 15: 247. 1925.

DISEASES OF PEA

ROOTROTS DUE TO VARIOUS ORGANISMS

Rootrot caused by Aphanomyces euteiches Drechsler

Aphanomyces rootrot was reported from New York, New Jersey, Delaware, Maryland, and Wisconsin. Except in Maryland and locally in Wisconsin it was apparently less prevalent and of minor importance in 1925. Losses reported were 10 per cent in Maryland, and 2 per cent in New Jersey and Wisconsin. Haenseler reported from New Jersey "In greenhouse tests, Canada field peas proved to be very susceptible and winter vetch slightly so." According to Jones and Drechsler (6, p. 294), "Although it seems unlikely that this fungus is parasitic only on peas, a search for other host plants has thus far been in vain."

Rootrot caused by Fusarium spp.

Fusarium rootrot was reported from New York, Maryland, and Georgia. Fusarium martii pisi Jones, according to Thomas (July 1), was important both in home gardens and commercial fields in Ohio.

Wilt caused by Fusarium sp.(undet.)

A wilt due probably to an undetermined species of Fusarium was stated by Linford (8) and by Jones and Linford (7) to be second in importance only to Aphanomyces rootrot in Wisconsin. The loss estimated in 1925 - 4 per cent - was greater than that reported for Aphanomyces. Vaughan stated that it was of major importance in the central section of the state. One canning variety, Green Admiral, and certain newer varieties show a high degree of resistance, according to Linford (8).

Seedling rot and rootrot caused by Pythium spp.

Pythium sp. causing seed and seedling rot was reported by Haenseler as less prevalent than usual and unimportant in New Jersey. The weather during the planting period was cold and rather dry. Damping-off was very serious locally in South Carolina, according to Fenner.

Jones and Linford (7) reported that although in the pea disease survey of Wisconsin in 1924 species of Pythium were found to be present in abundance in some soils, no instance of important injury from these fungi was recorded, due probably to the fact that comparatively high soil temperatures are necessary for their activity.

Jones and Drechsler (6, pp. 294-297) state that:

> " . . . . although it appears generally true that beets grow well on old pea fields and vice versa, experience is reported otherwise in the Salt Lake Valley, Utah. It may be of interest to note in this connection that in the course of making isolation from diseased peas from this valley with the writer, John W. Carlson, of the Utah Experiment Station, obtained among other fungi a culture of Pythium (Rheosporangium) aphanidermatum (Edson) Fitzpatrick, one of the well-known sugar-beet parasites. This is one of the species of Pythium which the writer has found capable of producing root rot of peas, and if it is widely distributed in this valley it may be the common parasite of these plants which renders pea growing on old beet field unprofitable."

Rootrot caused by Corticium vagum Berk. & Curt.

Rhizoctonia rootrot was reported from Massachusetts and Virginia, as follows:

Massachusetts: Found characteristic mycelium of Rhizoctonia, also cultured it, but could not find Aphanomyces sp. (Davis, July).

Rootrot, Rhizoctonia (?), serious throughout the state. In some sections growing of the crop has been abandoned because of inability to control this disease. (Osmun & Davis, Aug. 1).

Virginia: This disease is fast becoming the most serious trouble of fungous cause found on peas in eastern Virginia. It greatly reduces the stand. The writer's field notes indicate that it is most serious on potato land. (McWhorter)

Jones and Linford (7) found this in Wisconsin in the pea disease survey in 1924, but it was of minor importance.

Undetermined rootrots

Rootrots of undetermined cause were reported from Connecticut, New York, eastern Virginia, South Carolina, and Kansas. Chupp estimated a loss of 3 to 5 per cent in New York, but stated that, "The canning crop specialist of the state believes that much which this year was diagnosed as root rot was really Ascochyta blight, which he says was extremely severe in this state."

Recent literature:

1. Baunache. Pflanzenschutzmittel u. -geräte. Betanal. (Plant protection preparations and apparatus. Betanal.) Die Kranke Pflanze 2: 103-104. 1925.

2. Drechsler, Charles. Root-rot of peas in the middle Atlantic states in 1924. Phytopath. 15: 110-114. Feb. 1925.

3. Haenseler, C. M. What of the pea root rot? Experiment station facing the problem. New Jersey Agr. 7 (4): 4. April 1925.

4. Jones, F. R. A mycorrhizal fungus in the roots of legumes and some other plants. Jour. Agr. Res. 29: 459-470. Nov. 1, 1924.

5. ----------- Soil-inhabiting fungi parasitic upon the pea plant and their relation to disease. (Abstract) Phytopath. 15: 59. Jan. 1925.

6. ----------- and Charles Drechsler. Root rot of peas in the United States caused by Aphanomyces euteiches (n. sp.). Jour. Agr. Res. 30: 293-325. Feb. 15, 1925.

7. ----------- and M. B. Linford. Pea disease survey in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 64: 1-30. July 1925.

8. Linford, M. B. A wilt disease of peas in Wisconsin. (Abstract) Phytopath. 16: 75. Jan. 1926.

9. ----------- and R. E. Vaughan. Rootrot of peas. Wisconsin Agr. Exp. Sta. Circ. 188: 1-10. 1925.

10. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

11. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

12. Russell, H. L., F. B. Morrison, and W. H. Ebling. Root rot in peas surveyed. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 11-12. April 1925.

13. Stone, R. E. Root rot or blight of canning peas. (Abstract) Phytopath. 15: 300. May 1925.

BLIGHT CAUSED BY MYCOSPHAERELLA PINODES BERK. & BLOX.

Ascochyta blight was unusually severe in New York and New Jersey in 1925, as indicated in the quotations given below. It was said by Nelson to be the most prevalent pea disease in Michigan, although it caused very little damage. In other states reporting the disease, including Delaware, Maryland, Georgia, Florida, Ohio, and Wisconsin, it was unimportant.

New York: In looking over the pea fields of western New York last week, it developed that a type of disease simulating a wilt was due to an extraordinarily heavy infection with Ascochyta pisi. This fungus occurs heavily distributed over the aerial parts, causing withering from the top with very abundant minute spotting. (Charles Drechsler, Bur. Plant Ind., July 16).

Blight of peas caused by Ascochyta pisi during the season of 1925 caused a 10 to 20 per cent decrease in the pea crop yield of the state as well as reducing the quality of the canned product, according to L. K. Jones, Geneva Experiment Station. (Chupp)

New Jersey: General, very important as an underground disease, causing a firm brown rot of tap root and underground portion of stem. Leaf and pod blight very rare this year, but root rot stage unusually severe. Infection evidently from seed. (Haenseler)

BACTERIAL BLIGHT CAUSED BY BACTERIUM PISI (SACK.) EFS.

Bacterial blight was apparently somewhat more prevalent than usual in the states from which it was reported - eastern Virginia, Kentucky, South Carolina, Wisconsin, and Minnesota. In South Carolina it was said to be severe in the Coastal Plain area, where it caused heavy loss. In Wisconsin it was of general occurrence but worse in the northern pea sections. It was of major importance in early varieties, but very little occurred on sugar peas, according to Vaughan.

Pods of Little Marvel variety affected with a spot determined by Miss Helen Fox of the Bureau of Plant Industry to be caused by this organism were received from Valleau of Kentucky. Ludwig (1) has reported a podspot in South Carolina, observed first in 1922, due to an organism which he believes to be a strain of Bacterium pisi.

Recent literature:

1. Ludwig, C. A. Pseudomonas (Phytomonas) pisi Sackett, the cause of a pod spot of garden peas. (Abstract) Phytopath. 16: 75. Jan. 1926.

2. Manns, T. F., and J. F. Adams. (Report of) Department of plant pathology and soil bacteriology. Delaware Agr. Exp. Sta. Bul. 139: 24-29. 1925.

DOWNY MILDEW CAUSED BY PERONOSPORA VICIAE (BERK.) D BY.

In 1925 downy mildew was reported from Maine, New York, Wisconsin, and Iowa, in no case as of importance. Folsom stated that the disease had not previously been recorded for Maine.

In Supplement 41, on pages 195 and 285, Peronospora trifoliorum D By. is erroneously reported as occurring on peas in Wisconsin, as follows:

> "Peronospora trifoliorum D By., downy mildew - A second downy mildew on peas, reported for the first time to the Plant

Disease Survey, was found near Madison, Wisconsin, June 10 by F. R. Jones and M. B. Linford. Dr. Jones made the determination and reported that the fungus was the same as that occurring on sweet clover."

This report is an error due to misinterpretation of the following paragraph in a letter, dated July 21, 1924, from Dr. R. E. Vaughan:

> "Dr. Jones has examined these* carefully, and advises that there is no difference in the fungus on sweet clover and peas."

*-- Specimens of sweet clover and peas affected with downy mildew.

MOSAIC (UNDETERMINED)

Mosaic of peas was reported from New Jersey and Michigan. Haenseler reported that in the former state there was more than last year or than usual, and stated that "It is apparently increasing in importance yearly. This year as high as 60 per cent of the plants were observed affected in one small planting. Alaskas apparently are less affected than others." In Michigan mosaic occurred on all varieties of field peas in test grounds at East Lansing, according to reports.

Jones and Linford (2) report that in the pea disease survey in Wisconsin in 1924 mosaic was found in 63 fields in 10 counties, the amount of infection varying from a trace to 20 per cent. Injury apparently was negligible except in a few fields with heavy infection, and the disease is regarded as not likely to be so destructive as the mosaics of some other crops. Doolittle and Jones (1) state that the same disease occurs much more severely on sweet peas. Observations indicated that the source of infection of both garden and sweet peas was mosaic red clover, and inoculation experiments proved the mosaics of red clover and of garden and sweet peas to be intertransmissible. It is believed that the pea aphis, which overwinters on red clover, carries the disease in the spring from mosaic red clover to peas. No evidence of seed transmission has been found. Cross-inoculations from mosaic bean and sweet clover plants to garden peas and sweet peas gave only negative results.

Recent literature:

1. Doolittle, S. P., and F. R. Jones. The mosaic disease in the garden pea and other legumes. Phytopath. 15: 763-771. Dec. 1925.

2. Jones, F. R., and M. B. Linford. Pea disease survey in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 64: 1-30. July 1925.

OTHER DISEASES

Erysiphe polygoni DC., powdery mildew, was reported from New York, Florida, Washington, and Oregon. Weber reported that in Florida "It was very destructive on English peas in the vicinity of Gainesville during the past season, producing abundant perithecia." In Oregon, according to Barss, it was severe locally. The County Agent of Clatsop County reported that "Farmers growing peas for market controlled it satisfactorily this year by throwing sulfur dust on the plants by hand, which stopped all injury."

Septoria pisi West., leaf blotch. Vaughan reported from Wisconsin, "Occurs mostly on vines in full vigor. Little injury to weak vines and vigorous vines seem to stand it."

Stemphyllium polymorphum Bon. (probably), leafspot. Specimen received from Maine, determined by Drechsler, who stated that the fungus seemed to be a true parasite on the leaves.

Botrytis sp. causing stem lesions, specimen received from Maine.

Fertilizer burn, Connecticut. "Had a few cases called to our attention by County Agent where roots were injured by putting fertilizer in with seed and not properly mixing with soil. Verified by experiments later." (Clinton)

Hail injury was severe locally in Wisconsin on early Alaska plantings that had pods set at the time of storms, June 9 to 14. (Vaughan)

Recent literature:

1. Jones, F. R., and M. B. Linford. Pea disease survey in Wisconsin. Wisconsin Agr. Exp. Sta. Res. Bul. 64: 1-30. July 1925.
2. Reid, W. D. Collar-rot of peas. Incidence of the disease. New Zealand Jour. Agr. 30: 250-255. April 1925.

   Organism not given; disease is of decided economic importance.

DISEASES OF COTTON

WILT CAUSED BY FUSARIUM VASINFECTUM ATK.

Cotton wilt is a disease which is usually very destructive locally. When non-resistant varieties are planted on severely infested soil the losses are frequently very large and sometimes the entire crop is destroyed. In general, less damage from wilt than usual was reported throughout the cotton growing states in 1925. Probably the principal reason for the decreasing loss from cotton wilt is the increase in the use of wilt-resistant varieties, brought about through the efforts of extension workers and other federal and state agencies. The estimated losses for 1925 are shown in the following table.

Table 32. Estimated percentage loss from cotton wilt in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
5	South Carolina, Mississippi	2	North Carolina, Georgia
4	Alabama	1	Virginia, Louisiana, Texas, Arizona
3	Arkansas		

North Carolina: This disease is very destructive in the area near the South Carolina line in the coastal plain. It is much less abundant in the northeastern portion of the state. Dixie-Triumph wilt-resistant cotton ordinarily gives good control. (Fant)

South Carolina: Common over state wherever wilt-resistant cotton was not grown. (Fenner)

Georgia (southern): Usually always present where susceptible varieties are used. Growers turning more to resistant varieties. (Boyd)

Mississippi: Unusually severe and serious damage in many localities. Drought and heat increased damage. (Beal)

Arkansas: Prevalent over much of state, causing serious loss in many sections. (V. H. Young)

Porto Rico: Severe on Sea Island cotton in one locality. (Cook)

Rosen (2) reports that Fusarium vasinfectum prevents cotton seed from germinating and causes damping-off of the seedlings. Young (3) found that apparently there are distinct strains of the fungus, varying in pathogenicity for cotton.

Recent literature:

1. Kottur, G. L. Improvement of cotton by breeding wilt resistant strains. Bul. Dept. Agr. Bombay, India, 119: 15-18. 1925.

2. Rosen, H. R. Fusarium vasinfectum and the damping off of cotton seedlings. Phytopath. 15: 486-488. Aug. 1925.

3. Young, V. H. Cotton wilt studies. (Abstract). Phytopath. 16: 76. Jan. 1926.

ANTHRACNOSE CAUSED BY GLOMERELLA GOSSYPII (SOUTHWORTH) EDG.

Anthracnose was present in practically all of the cotton states, but much less damage than usual was reported in 1925. This was attributed to the unusually dry summer which prevailed in the Southern States. The effect of this exceptionally dry weather upon the severity of anthracnose is well illustrated in the accompanying table, in which estimated losses from anthracnose and the departures from normal rainfall in the cotton states during August and September in 1920 and in 1925 are compared.

Some comments by collaborators regarding weather and anthracnose follow:

North Carolina: Excessively dry season held anthracnose in check. (Fant).

Georgia: North Georgia very dry, South Georgia dry late in season. Fairly dry in early season in all parts of state. (R.R.Childs)

Georgia (southern): Slow and sparing development in April and May due to dry weather. (Boyd)

Alabama: Extremely dry weather almost prohibited the growth of any anthracnose. (Blain & Miles)

Mississippi: Damage light over state as a whole. A few heavy infections in lowlands and rank growing cotton. One per cent. (Beal)

Arkansas: Appears to be of little importance this year. Dry weather apparently unfavorable. (V. H. Young)

Table 33. Estimated losses from cotton anthracnose, and departures from the normal rainfall during August and September, 1920 and 1925.

State	1920			1925		
	Precipitation departure from normal		Percentage loss	Precipitation departure from normal		Percentage loss
	August	Sept.		August	Sept.	
Virginia	+2.35	-0.16	5	-2.12	-1.58	0.5
North Carolina	+2.30	+0.95	15	-2.63	-1.96	1
South Carolina	+1.95	+1.48	8	-4.40	-2.14	Trace
Georgia	+2.31	+0.05	5	-3.73	-2.10	0.1
Alabama	+2.48	-0.71	2	-3.17	-0.85	Trace
Mississippi	+0.58	-0.19	3	-2.02	-0.24	--
Louisiana	+1.10	-0.02	5	-1.98	+1.69	1
Texas	+3.03	-0.65	1	-0.38	+1.53	0
Arkansas	+0.27	+0.06	2	-2.02	+2.63	Trace

Lehman (1) found that the anthracnose fungus present in infected cotton seed could be destroyed by exposing the seed to 20 to 24 hours desiccation at 60° to 65° C., followed by 12 hours of heating at 95° to 100° C., without reducing the percentage of germination. The anthracnose fungus was found to be killed in the seed by the dry heat, while the preliminary desiccation was necessary to prevent destruction of the germinability of the seed. He describes and illustrates a machine for treating cotton seed in bulk with dry heat.

Recent literature:

1. Lehman, S. G. Studies on treatment of cotton seed. North Carolina Agr. Exp. Sta. Tech. Bul. 26: 1-71. July 1925.

2. Ludwig, C. A. Studies with anthracnose infection in cotton seed. South Carolina Agr. Exp. Sta. Bul. 222: 1-52. 1925.

ANGULAR LEAFSPOT CAUSED BY BACTERIUM MALVACEARUM EFS.

Only two states, Louisiana and New Mexico, reported angular leafspot to be more prevalent than during the average year and more prevalent than in 1924. In Arkansas it was reported to be more prevalent than in 1924, but the same as average years. In none of the other nine states from which it was reported was it said to be more prevalent than in 1924, or than average years. It was not observed in California in 1925.

Table 34. Estimated percentage losses from angular leafspot in 1925.

Percentage loss	States reporting	Percentage loss	States reporting
3	Arkansas, Arizona	1	Georgia, Texas
2	New Mexico	Trace	Virginia
1.5	Alabama		

North Carolina: Little damage, apparently because of dry season. (Lehman)

South Carolina: Severe leaf spotting and stalks infected heavily. Reported only in Piedmont region. (Fenner)

Georgia (southern): Mostly leaf-spotting; very little boll rot. Light infection over entire Coastal Plain, especially in low, damp areas. (Boyd)

Alabama: Extreme drought of past summer responsible for decrease in prevalence. (Miles & Blain)

Arkansas: Common but apparently causing less damage than usual. Boll-rotting by secondary invasion not favored by dry weather. (V. H. Young)

New Mexico: Considerable seed delinted with sulphuric acid. This gives good control. (Crawford)

Brown and Gibson (2) describe a machine which they devised for treating cotton seed with sulphuric acid, particularly for the control of this disease.

Recent literature:

1. Ashby, S. F. Control of angular leafspot of cotton. Trop. Agriculture 3: 8-9. Jan. 1926.
2. Brown, J. G., and Frederick Gibson. A machine for treating cotton seed with sulphuric acid. Arizona Agr. Exp. Sta. Bul. 105: 381-391. 1925.
3. Rolfs, F. M. Two important cotton diseases and their control. Oklahoma Agr. and Mech. Coll. Ext. Div. Circ. 208: 1-8. 1925.

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL.
(CACONEMA RADICICOLA (GREEF) COBB)

In 1925 rootknot was reported from practically all of the cotton states, but it was considered important only in local areas, where it was associated frequently with Fusarium wilt. It is well known that when wilt-resistant cotton is planted on soil severely infested with both Fusarium vasinfectum and Heterodera radicicola, it may become more or less severely infested with wilt. A case of this kind was reported from Georgia by Boyd, who stated that wilt was common in resistant varieties on root-knot land. The estimated losses from rootknot in 1925 were as follows: New Mexico, 3 per cent; Arkansas, 2 per cent; southern Georgia, 2 per cent; Alabama, Texas, and Arizona, a trace.

BLIGHT CAUSED BY ASCOCHYTA GOSSYPII SYD.

Ascochyta blight, which prior to 1924, had been reported only from Arkansas, was again reported from North Carolina and South Carolina, but not from Virginia, in 1925, and was reported to the Survey for the first time from Alabama and Mississippi. The following are statements from collaborators regarding this disease:

> North Carolina: It may be of interest to plant pathologists to have a statement regarding the occurrence of Ascochyta blight of cotton in North Carolina in 1925. The first observed occurrence of this disease was on June 19 when a package of young plants badly affected with a disorder which was diagnosed as tomosis by Dr. O. F. Cook was sent from Lee County to the Plant Disease Laboratory of the North Carolina Agricultural Experiment Station. On the cotyledonary leaves of the plants there occurred lesions resembling those produced by Ascochyta gossypii on ordinary foliage leaves and bearing pycnidia and pycnospores which agree in morphological features with those of that fungus. In the same week the disease was found on seed leaves of young plants received from two other counties, making a total of three, all lying west of Raleigh. In these three counties the disease did not appear on cotton at any time later in the season.
>
> During the first week of July the disease appeared again, this time in mild epidemic form in parts of three counties lying east of Raleigh. Not over 10 per cent of the plants in any field were affected. In these counties the disease developed after rainy weather of several days duration. An early decrease in the frequency and amount of rainfall caused the disease to disappear and most of the infected plants apparently completely recovered.
>
> The early summer of 1924 was marked by prolonged and frequent rainfall and in that year Ascochyta blight occurred in epidemic form over the greater portion of the cotton growing area of the state. The summer season of 1925 was characterized by drought, and in this year Ascochyta blight failed to occur in

serious form, except in the few isolated areas noted above which did experience temporary excesses of rainfall. (Lehman)

South Carolina: Present in Spartanburg County. The specimen showed considerable angular leafspot also, so that it is likely that the weather had been moist where the outbreak occurred. The weather, in general, however, has been unusually dry. (Ludwig, July 31)

Alabama: We have found an infection of Ascochyta blight, *Ascochyta gossypii*, on cotton at Luverne, Alabama.

The first infection in Alabama was found last year at Ashford, in the extreme southeastern part of the state. This year's infection is about 100 miles north of last year's infection. This is rather remarkable to me in that the weather around Luverne has been dry this year. Elliott reported the infection in Arkansas as bad in rainy weather, with an abrupt stopping of the infection and recovery of some plants with the advent of dry weather. The man who sent the sample in to the office said it was local, occurring in only one spot in the field. (Blain, July 3)

Mississippi: This disease was reported in August from Lowndes County near Columbus, Mississippi, and was observed by the writer. A small area in this particular field was infected. The damage, however, to infected plants was 100 per cent, as in many cases the plants were killed from the tops about two-thirds of the way down the stalk. This is the first report of Ascochyta blight of cotton in Mississippi. (Neal, Sept.)

LEAFSPOT CAUSED BY ALTERNARIA SP.

A very severe outbreak of Alternaria leafspot was reported from Arizona in 1925. The disease was also reported from Virginia, Mississippi, Arkansas, and California. Collaborators from Mississippi and Arkansas reported it to be associated with potash deficiency and dry weather injury. In Virginia it was said to be associated with angular leafspot and red spider injury.

In a letter dated November 24, 1925, Collaborator D. C. George of Arizona wrote the following:

> "This disease occurs every year in Arizona, and especially in the Salt River Valley. The present outbreak is the most severe that I have ever observed, although the season of 1919 was a close second. During the past month I have visited practically all of the communities of the Salt River Valley and everywhere the disease is found. No one section or district is any more seriously attacked than another. Much of the early shedding of the leaves of the Pima cotton I attribute to this disease.
>
> "It appears that the present outbreak is somewhat related to the weather. On September 17 and 18 nearly one-half inch of rain fell. Cloudy weather with high humidity prevailed for some

> time following, and on October 5 and again on October 15 we had some slight showers. This rainfall was earlier than usual and before any frosts had occurred. The fruiting stage of the organism seemed to develop rapidly during this period.
>
> "The disease occurs on all the varieties of cotton that I have examined, but is very light upon the short staple cotton. In this section this is principally the Acala, the Mebane, and a variety known as the Hartsville cotton. The Acala predominates in practically all the region. Probably 50 per cent of the cotton in the Salt River Valley is the Pima variety of the long staple cotton. Upon this cotton the disease was very abundant and, as I have already stated, caused an early shedding of the leaves. Since the outbreak came after the largest majority of the bolls were nearly mature and some picking was in progress I can hardly make an estimate of the actual loss occasioned by the disease."

BOLL ROTS AND BOLL SHEDDING DUE TO VARIOUS CAUSES

Boll rots due to Diplodia gossypina Cke. (Physalospora gossypina (Cke.) Stevens (4)), Phytophthora sp., and Fusarium sp. were reported from Porto Rico. Diplodia boll rot was reported from Georgia also, and undetermined boll rots from South Carolina and Arkansas. Shapovalov makes the following statement regarding boll shedding and boll decay in California.

> "Shedding of young bolls has been very pronounced this season. Judging from the number of complaints and inquiries it has probably been greater than usual. Very often the shed bolls are showing a brown discoloration of the pedicel near the bracts, and several fungi have been isolated from such discolored areas.
>
> "Several forms of boll decay have been observed, principally on the earlier sets. In many cases the infection was clearly originating with an insect injury, particularly that of the boll worm, but in some instances no such injury was apparent, or at least it was too small to be detected after the decay had set in. Species of Rhizopus, Fusarium, and Aspergillus have been found associated with the decaying bolls."

Aspergillus niger Tiegh. is reported by Shapovalov (3) to be causing decay of cotton bolls in the southwestern states. He says,

> "A peculiar decay of cotton bolls has been prevalent during the last few years in the southwestern states. It appears at first as a soft, pinkish, circular spot and may spread over the entire boll. The latter prematurely dries up and becomes filled, and covered on the outside with black masses of spores which give it the appearance of being affected by smut. It is erroneously known as smut in some cotton-growing sections of California. The fungus causing this decay is Aspergillus niger. The infection is sometimes associated with insect wounds, but frequently such injuries are not apparent...."

irkpatrick (2) reports that Rhizopus nigricans Ehr. is an important cause of boll decay in Egypt, infecting the bolls through insect punctures. At least two species of Phytophthora, one of them apparently having two strains, are responsible for the soft rot of cotton bolls in the West Indies, according to Hopkins (1).

Recent literature:

1. Hopkins, J. C. Notes on the soft rot of cotton bolls in the West Indies caused by Phytophthora. Ann. Bot. 39: 267-280. April 1925.

2. Kirkpatrick, T. W. Notes on the fungus Rhizopus nigricans Ehr. in relation to insect pests of the cotton plant in Egypt. Bul. Tech. & Sci. Serv. Min. Agr. Egypt 54: 28 pp. 1925.

3. Shapovalov, Michael. Aspergillus decay of cotton bolls. (Abstract) Phytopath. 16: 75. Jan. 1926.

4. Stevens, Neil E. The life history and relationships of Diplodia gossypina. Mycologia 17: 191-201. 1925.

SORESHIN CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Losses reported as due to Rhizoctonia are New Mexico 5 per cent, Texas one-half per cent, Arizona a trace. The disease was also reported from Louisiana, California, and Porto Rico.

Arizona: Two-thirds reduction of stand in a 20-acre field of cotton in Cochise County. The injury was aggravated by irrigating the field when the young plants showed the first injury. (Streets)

California: Due to exceptionally cool weather during the early stages of growth there was more than the usual amount of sore-shin. As a rule, however, the worst attack of the disease appeared before the cotton was thinned out and the stands therefore were not affected appreciably. Only in a few instances in the San Joaquin Valley dead patches several yards in diameter could be observed in certain fields as a result of the sore-shin infection. (Shapovalov)

Briton-Jones (1) gives the cause of sore-shin in Egypt as Rhizoctonia crocorum (Pers.) DC.

Recent literature:

1. Briton-Jones, Harry R. Mycological work in Egypt during the period 1920-1922. Bul. Tech. & Sci. Serv. Min. Agr. Egypt 49: 1-129. 1925.

ROOTROT CAUSED BY OZONIUM OMNIVORUM SHEAR
(HYDNUM OMNIVORUM SHEAR)

Ozonium rootrot caused losses estimated at 8 per cent in Arizona, 5 per cent in New Mexico, and one per cent in Texas, and was reported from California also.

Arizona: In southern half of state. (Streets)

California: The Ozonium rootrot is quite prevalent in the eastern cotton sections of California, along the Colorado River, namely in the Bard Section and in the Palo Verde Valley, but has not yet been found either in the Imperial or in the San Joaquin Valleys. (Shapovalov)

Shear (2) has described a fungus considered to be the perfect form of the rootrot organism as *Hydnum omnivorum* Shear.

Recent literature:

1. Rolfs, F. M. Two important cotton diseases and their control. Oklahoma Agr. & Mech. Coll. Ext. Div. Circ. 208: 1-8. 1925.

2. Shear, C. L. The life history of the Texas root rot fungus, Ozonium omnivorum Shear. Jour. Agr. Res. 30: 475-477. 1925.

POTASH DEFICIENCY (NON-PARASITIC)

"Rust" was reported unusually severe in Mississippi in 1925, the dry hot summer having made it prevalent in thin, sandy soils. Rolfs stated that it was common in various sections of Oklahoma, the injury resulting being slight in most cases, but as much as 20 per cent in some. The disease was said to be rather prevalent in Arkansas and unimportant in South Carolina.

OTHER DISEASES

Cerotelium gossypii (Lagh.) Arth. (*Kuehneola gossypii* (Lagh.) Arth.), rust. Porto Rico.

Helminthosporium gossypii Tucker, leaf, bract, and boll spot. Porto Rico.

Macrosporium nigricantium Atk., leafspot, black rust. South Carolina.

Mycosphaerella gossypina (Cke.) Earle (*Cercospora gossypina* Cke.), leafspot. Louisiana, Texas, Porto Rico.

Puccinia hibisciata (Schw.) Kell. (*Aecidium gossypii* Ell. & Ev.), rust. Texas.

Ramularia areola Atk., frosty mildew. Georgia, Porto Rico.

Sclerotium rolfsii Sacc., seedling disease. Porto Rico (one plant on Station grounds).

Recent literature:

1. Kalantarian, P. Zwei neue Bakteriosen der Baumwollstaude in Armenien. Centralbl. Bakt. Abt. II, 65: 297-301. Oct. 8, 1925.

   Bacterium erivense causing disease of seedling roots, B. löhnisi on flower and capsule.

DISEASES OF TOBACCO

WILDFIRE CAUSED BY BACTERIUM TABACUM WOLF & FOSTER

Wildfire was first reported from North Carolina in 1917. It is now known to occur in practically all tobacco growing regions in the country, having been reported from additional states and parts of states almost every year since that time. In 1925 wildfire was reported from Massachusetts, Connecticut, New York, Maryland, Virginia, South Carolina, Georgia, Florida, and Wisconsin, and from Canada for the first time by Slagg and Major. The following are some of the reports of collaborators regarding the occurrence and severity of wildfire in 1925.

Massachusetts: Very serious in the field especially following seedbed infection in the Connecticut Valley. (Osmun & Davis)

Connecticut: Little in seed beds. Common in mid-season, but finally did less injury than expected. (Anderson)

Maryland: During the summer, following a series of showers, wildfire appeared in a large number of fields. Many of these fields were surveyed and in some cases injury was slight while in others the lower leaves were severely infected and the disease was found on practically all of the leaves. In one instance the crop was harvested prematurely to prevent total loss. The most severe injury was found in fields which had been set from beds in which wildfire had occurred, but which had not been sprayed or dusted. Later inspections indicated that further dissemination of the disease was prevented by the dry weather during the remainder of the season. (Jehle)

Florida: Appeared locally, damage slight. Four plant beds of about one-fourth acre each destroyed. Two were covered with second hand cloth from Connecticut. The other two were fertilized with tobacco trash from packing houses. No plants from any bed were transplanted. (Tisdale)

Georgia: Lack of development probably due to general lack of sufficient and frequent rainfall. (Boyd)

Wisconsin: Wildfire did little damage this year due to dry weather in May which did not favor seed bed infection, and dry weather in August. The absence of storms was also unfavorable for disease spread. Disease present on about 50 farms. (Johnson)

Quebec: Found on 6 farms near St. Cesaire. Owing to the dry weather during the month of August the damage was light. This is the first positive record of the occurrence of this disease in Canada. (Slagg & Major, Sept. 25)

Control of wildfire

For the control of wildfire general sanitation combined with seed treatment are most generally recommended. The bichloride of mercury treatment which consists in soaking the seed 10 to 15 minutes in a 1 to 1000 solution followed by thorough washing and drying of the seed is in most general use. Johnson and Murwin (4) found that infected tobacco seed could be successfully disinfected with a 1 to 1000 solution of silver nitrate. They believe two 5 or 10 minute treatments (drying the seed between treatments) is required for wildfire control. Seed bed spraying and dusting with a copper fungicide were found by Anderson (1) to check the spread of wildfire in the seed bed, provided the fungicide was supplied frequently enough to keep the leaves covered at all times.

Requests were sent to a number of tobacco specialists for results of seed treatment and seed bed dusting and spraying and the following information was received.

Connecticut: Seed treatment has been tried but the results are not easy to interpret. When wildfire gets into the seedbed one never knows whether it came in on the seed or by some other channel. I have frequently found wildfire in beds where the seed was sterilized. It is doubtful whether infected seed has much to do with our trouble here.

Seedbed spraying is efficient and our very best method of controlling wildfire, and I depend on it almost entirely. We have used both copper-lime dust and various Bordeaux sprays, but the liquid is preferred. Spraying is better in the hands of the average grower. Field spraying has given promising results but is not usually recommended because it is too much work. (Anderson)

Maryland: No seed treatment tests were conducted. Approximately 500 seed beds were sprayed with Bordeaux mixture or dusted with copper-lime dust at weekly or ten-day intervals. In many beds the treatment was begun as soon as the tobacco leaves reached the size of a dime and continued until the plants were set in the field. No wildfire was found in any of these beds at any time. In several instances the tobacco growers left one or two untreated beds and in two such instances wildfire was found in the undusted beds. In many instances the beds were treated after wildfire had been found in them, varying in amount from a mere trace to severe infestation. In all such cases the disease was checked by the treatment and thrifty plants were obtained. When wildfire appeared in the beds early in the season and they were not treated, severe injury resulted, many of the plants being weak and stunted. When wildfire appeared late in the season its further spread was checked by dry weather, infected plants recovered, more or less, and there was little injury in untreated beds. (Jehle)

Virginia: Bichloride of mercury seed treatment gave good results when sanitary measures were observed. No spraying or dusting used excepting for flea beetle control.

Field occurrence is related directly to plant bed condition. If plant bed is free from disease, field will also be free. (Fromme)

Kentucky: Bichloride of mercury and formaldehyde seed treatment probably reduce infection in bed, but will not give control where other sanitary precautions are not carefully followed out. Plant bed infection is nearly sure to be followed by field infection if weather conditions are right. Seedbed spraying and dusting have not been tried. (Valleau)

Tennessee: Bichloride of mercury seed treatment gave good germination and clean plants, but no disease appeared on plants grown from untreated seed. Plants dusted only for insect control. (Sherbakoff)

Florida: Bichloride of mercury seed treatment - No infection in beds where new cloth was used for cover and beds were made on sterilized soil.

No infection has occurred in fields set with healthy plants, even though the crop was infected previously.

Seedbed spraying with Bordeaux 2-2-50 also 4-4-50, four to six applications. No bed showed infection, probably due to sanitary precautions observed. Seedbed dusting with Saunders copper-lime dust, 3-8 applications.

Where disease had appeared before treatment was begun further spread was checked, but severe infection developed in field on plants from treated beds. (Tisdale)

Wisconsin: The silver nitrate seed treatment discussed above gave more complete control of tobacco wildfire than treatment with corrosive sublimate and was less injurious to seed germination. Complete control in the seedbed usually results in complete control in the field. Spraying the seedbed with Bordeaux mixture gave only partial control. Dusting the seed bed with copper-lime dust gave only partial control. Spraying and dusting are not being recommended in Wisconsin. (Johnson)

Anderson (2) has reported the results of his investigations on the susceptibility of species, varieties, and hybrids of Nicotiana to wildfire. Forty-one horticultural and botanical varieties of N. tabacum were tested, of which not one showed any significant resistance. All the varieties of N. rustica and N. alata tried were highly resistant, as were also N. repanda, N. nudicaulis, and N. attenuata. The other species tested were susceptible in varying degrees, from somewhat resistant to much more susceptible than N. tabacum. Hybrids resulting from crossing the resistant species N. nudicaulis and N. alata with the susceptible N. tabacum were resistant but failed to set seed.

Recent literature:

1. Anderson, P. J. Controlling tobacco wildfire in the seed bed. Phytopath. 13: 59. 1923.

2. ----------- Susceptibility of Nicotiana species, varieties, and hybrids to tobacco wildfire. Phytopath. 15: 77-84. Feb. 1925.

3. Cooper, Thomas. Bacterial leaf-spot of tobacco. Ann. Rept. Director, Kentucky Agr. Exp. Sta. 37 (1924): 30-31. 1925.

4. Johnson, James, and Herbert F. Murwin. Experiments on the control of wildfire of tobacco. Wisconsin Agr. Exp. Sta. Res. Bul. 62: 1-34. 1925.

BLACKFIRE CAUSED BY BACTERIUM ANGULATUM FROMME & MURRAY

States from which blackfire was reported in 1925 were Connecticut, New York, Virginia, Kentucky, North Carolina, Georgia, Florida, Indiana, and Wisconsin. This is the first report of blackfire from New York. It was also reported by Slagg and Major to be present to a limited extent in the Quebec and Ontario districts of Canada. Following are some of the statements of collaborators regarding the occurrence of blackfire:

Connecticut: More frequent than I have seen it before in the Connecticut Valley. (Anderson)

New York: I found blackfire or angular leafspot of tobacco on six farms in the Big Flats district of Chemung and Steuben Counties. In some cases the infection was mixed with wildfire and in others was distinct. Counts and estimates indicated a range in severity between a trace and 100 per cent affected plants. Blackfire seems to be fully as severe in that district this season as wildfire in the fields in which it occurs. So far as I know, this is the first time that blackfire has been found in New York state. (Thomas)

Virginia: Blackfire is becoming fairly prevalent, especially in sections that have had fair rains, and some crops have been harvested early to prevent further spread of disease. As a rule infection is limited to occasional plants in low areas. (Fromme)

Kentucky: Seed treatment with other sanitary precautions has failed to give complete control of angular leafspot and wildfire again, if seed from the previous crop was used. In rather extensive tests two-year old seed has produced leafspot free plants both on the Experiment Station Farm and on other farms where proper sanitary precautions were included. This appears to be a simple and very efficient method of eliminating this source of infection and will eliminate the seed treatment recommendation. Seed from plants from which all leaves were stripped at setting time have in one instance produced seed which resulted in a leafspot free bed. The seed plants were from an infected bed and were set in an isolated spot in the garden away from other tobacco. Several beds planted with two-year old seed were observed which were entirely free from leafspot diseases, except at one corner where the men made their inspections of the beds. These cases suggested very strongly infection from infected chewing tobacco spit into the corner while making the inspection. One instance was noted where infection with angular leafspot and wildfire in a bed sowed with two-year old seed could be traced to the use of canvas hung in a tobacco barn with an infected tobacco crop. (Valleau)

North Carolina: This disease is prevalent in North Carolina each season. It has been noted by the writer for the past three years. (Fant)

Florida: One bed, one-fourth acre, in Gadsden County showed infection early in the season. Dry weather prevented further spread in bed. Damage slight. (Tisdale)

Wisconsin: Less blackfire than last year, more commonly present than wildfire, but little damage done this year. (Johnson)

Recent literature:

1. Cooper, Thomas. Bacterial leaf-spot of tobacco. Ann. Rept. Director, Kentucky Agr. Exp. Sta. 37 (1924): 30-31. 1925.
2. Russell, H. L., F. B. Morrison, and W. H. Ebling. Black fire in Wisconsin tobacco. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 9-11. 1925.

BLACK ROOTROT CAUSED BY THIELAVIA BASICOLA (BERK. & BR.) ZOPF

Massachusetts, Connecticut, New York, Florida, and Wisconsin reported this disease in 1925. It was also reported from Canada.

Massachusetts: Certain of Johnson's Wisconsin strains show high resistance. (Osmun & Davis)

Connecticut: General in Connecticut and Housatonic Valleys. (Anderson)

Florida: Appeared locally. In general, the weather was too warm and dry to favor development of rootrot. Also a small per cent of the crop was planted on old land. Damage was slight. (Tisdale)

Wisconsin: Rootrot occurred to a considerable extent this year on the older tobacco soils, being favored by a relatively cool season in June and early July. Occasional fields were complete losses, but more frequently the disease damaged the crops from 5 to 50 per cent. I would estimate that only about 10 per cent of the fields were affected, however. (Johnson)

Canada: Quite common in the seedbeds in Quebec and to a limited extent in Ontario. Owing to the comparatively dry season there was considerably less injury in the field than in 1924 in Quebec and Ontario. Present to a limited extent in British Columbia. (Slagg & Major)

Recent literature:

1. Clinton, G. P. (Report of the Connecticut State Station, department of) Botany. Connecticut State Agr. Exp. Sta. Bul. 264: 207-210. 1925.
2. Cooper, Thomas. Tobacco black root-rot. Ann. Rept. Director Kentucky Agr. Exp. Sta. 37 (1924): 28-29. 1925.
3. McCormick, F. A. Perithecia of Thielavia basicola Zopf in culture and the stimulation of their production by extracts from other fungi. Connecticut Agr. Exp. Sta. Bul. 269: 539-554. Aug. 1925.
4. Orton, C. R., and O. Olson. Tobacco resistant to black root-rot in Pennsylvania. Pennsylvania Agr. Exp. Sta. Bul. 193: 3-13. March 1925.

MOSAIC (UNDETERMINED)

Mosaic was reported from Connecticut, New York (estimated loss a trace to 2 per cent), Maryland (estimated loss 2 per cent), Virginia, Kentucky, North Carolina, South Carolina, Georgia, Florida, Indiana, Illinois, and Porto Rico. It was also reported from Canada by Slagg and Major as fairly common in Quebec and Ontario, and present to a limited extent in British Columbia.

Maryland: Very common and prevalent, some in almost every field. Percentage of infected plants usually large, often 95 per cent. (Jehle & Temple)

Virginia: Very prevalent in Amherst County, some fields showing 50 to 60 per cent affected plants. (Fromme)

Kentucky: Tests to control tobacco mosaic through the thorough eradication of mosaic carrying weeds from the tobacco bed have had no apparent effect. At setting time we have been unable, so far in our beds, to find any mosaic in the tobacco. Initial infection ranges from slight in parts of fields to 8 and 10 per cent in other parts and the plants are so distributed as to indicate that certain men pulling plants cause high percentage of initial mosaic infection, and others very slight or none. Most tobacco men in Kentucky chew the natural leaf from the previous crop. By wetting the hands in chewing tobacco decoction and pulling plants, we have obtained 83 per cent infection in about 170 plants, while the checks pulled with clean hands from the same area in the bed, remained free. Other evidence indicates that when clean plants are set in the close vicinity of mosaic infected weeds very early in the season and are fed upon extensively by flea beetles, they will still remain free if not handled by man. It appears now that infected chewing tobacco will largely explain initial mosaic infection, although the mosaic weed carriers may, and undoubtedly do, under some circumstances, play a part in dissemination of mosaic. (Valleau)

North Carolina: Prevalent in eastern portion of the state. (Fant)

Unusually widespread in tobacco sections. As a rule farmers do not pay much attention to it but this year they were much concerned. No estimate of loss is available but serious damage resulted. (W. W. Garner)

Georgia (southern): Considerable importance in the older tobacco sections (flue cure). Topmost leaves only injured;-lowering quality of affected leaves. Seventy-five per cent in a 3-acre field, Valdosta, only the upper 3 or 4 leaves showing symptoms. (Boyd)

Florida: Mosaic appeared locally, many fields in Gadsden County slightly affected. The damage was very slight. The disease was found on few plants in several fields early in the season. It became general on suckers after plants were topped. (Tisdale)

Requests for information upon the effect of mosaic upon yields and quality were sent to a number of tobacco specialists and the following statements were received:

Connecticut: Effect on yield - Reduces yield considerably if plant is attacked early.

Effect on quality - Absolutely ruins our cigar types of tobacco. (Anderson)

Maryland: Effect on yield - When mosaic attacks the plant early in its development the yield is affected. Ten healthy plants and ten plants severely infected with mosaic were cut from the same field and stored in the same tobacco barn. When cured the infected plants weighed 5 pounds and the uninfected plants weighed 6 1/5 pounds.

Effect on quality - The same plants were graded by an expert tobacco grader who was not aware of the presence of mosaic in them. The infected plants were valued at 10 cents per pound less than the uninfected plants. (Jehle)

Virginia: Effect on yield - Uncertain. It is quite prevalent especially near the end of the season. Farmers do not worry much about it.

Effect on quality - Some reduction in quality and price, but not of sufficient moment to bring the loss home to the farmers. They have leaf troubles of greater importance, such as blackfire and drought-spot, and the presence of mosaic does not worry them. (Fromme)

Kentucky: Effect on yield - No figures on this, but in some cases it undoubtedly reduces it markedly if there is extensive initial infection.

Effect on quality - No figures, but mosaic burning in Burley tobacco is often extensive and must reduce quality very appreciably. (Valleau)

Tennessee: Effect on yield - The yield is reduced appreciably.

Effect on quality - Apparently the quality is lowered; however, I am not able to state definitely to what extent. (Sherbakoff)

Georgia: Effect on yield - Not determined, except as in a general survey, very little reduction.

Effect on quality - Not determined. (Boyd)

Florida: Effect on yield - Does not occur in sufficient amounts to affect yield. Usually does not develop except on suckers.

Effect on quality - Caused light chaffy or papery leaves, which are discarded. (Tisdale)

Wisconsin: Effect on yield - Early mosaic infection usually markedly lowers yield, but this is of course proportional to percentage of plants affected. Late infection (which is common) may not appreciably affect yield.

Effect on quality - The effect of quality applies particularly to cigar wrappers and binders, the leaf being usually less elastic, more "papery", lacking in good color and in some cases spotted due to necrotic effect of virus under certain conditions. (Johnson)

Results of experiments conducted by Elmer (2) seem to indicate that healthy plant juices produce an inhibitory effect on tobacco mosaic virus, but that this effect is not permanent. The same writer (3) has also studied the transmissibility of the mosaic virus. Successful infection was obtained on tobacco from bean (*Phaseolus vulgaris*), cucumber (*Cucumis sativus*), crookneck squash (*Cucurbita pepo condensa*), *Zinnia elegans*, *Calendula officinalis*, *Stokesia laevis*, sugar cane (*Saccharum officinarum*), corn (*Zea mays*), celery (*Apium graveolens*), *Rubus strigosus*, *Asclepias syriaca*, *Martynia louisiana*, *Abutilon theophrasti*, *Euphorbia preslii*, *Aquilegia canadensis*, *Aquilegia coerulea*, *Datura stramonium*, and *Nicotiana glutinosa*. Mosaic was transmitted from tobacco to *Cucurbita pepo*, *Martynia louisiana*, and *Nicotiana glutinosa*. Walker (16) found that the mosaic of *Nicotiana glutinosa* was readily transferred to tobacco.

Johnson (7, 14) produced "mottle", "spot necrosis", and "ringspot" by inoculating tobacco plants with extract from apparently healthy potato plants, and in a paper read before the American Phytopathological Society (6), he stated that at least six other virus diseases may affect tobacco and related plants.

In another paper Jones (8) described a mycetozoan found by him in tobacco plants with mosaic-like symptoms. Mulvania (10) attempted to grow the tobacco mosaic virus in culture by using Olitsky's method (11), but was unsuccessful. McKinney and Webb (9) state that in the course of dilution experiments, using mosaic virus from a single plant "By inoculating the plants of a given experiment with diluted virus from a mosaic plant resulting from inoculations with highly diluted virus in the preceding experiment, mosaic was obtained in the eighth experiment in practically undiminished amounts from virus which had passed through eight plants and which had been diluted in water equivalent to 10^{-33}. A single water dilution of this magnitude being far too great to produce mosaic, it is evident that the quantity of virus increased in the plants." They report also that their studies show that tobacco mosaic infection may occur from the soil.

Recent literature:

1. Dickson, B. T. Tobacco and tomato mosaic. Science n. s. 62: 398. Oct. 30, 1925.

2. Elmer, O. H. Inhibition of mosaic infection. (Abstract) Phytopath. 16: 67-68. Jan. 1926.

3. ----------- Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

4. Hansen, A. A. Controlling diseases by destroying weeds. Better Crops 4 (4): 22-23, 28-29. June 1925.

5. Hauduroy, P. La nature du virus de la mosaique de tabac. Rev. Path. Comp. 25: 748-750. July 20, 1925.

6. Johnson, James. New virus disease of tobacco and related plants. (Abstract) Phytopath. 16: 66. Jan. 1926.

7. ----------- Transmission of viruses from apparently healthy potatoes. Wisconsin Agr. Exp. Sta. Res. Bul. 63: 1-12. 1925.

8. Jones, Philip M. A mycetozoan found in tobacco plants with mosaic-like symptoms. (Abstract) Phytopath 16: 67. Jan. 1926.

9. McKinney, H. H., and R. W. Webb. The dilution method as a means for making certain quantitative studies of viruses. (Abstract) Phytopath. 16: 66. Jan. 1926.

10. Mulvania, M. Cultivation of the virus of tobacco mosaic by the method of Olitsky. Science n. s. 62: 37. July 10, 1925.

11. Olitsky, Peter K. Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exper. Medicine 41: 129-136. Jan. 1925.

12. Olitsky, Peter K. The transfer of tobacco and tomato mosaic disease by the Pseudococcus citri. Science n. s. 62: 442. Nov. 13, 1925.

13. ---------- and John H. Northrop. The inoculation of tomato and tobacco plants with potato mosaic virus. Science n. s. 61: 544-545. 1925.

14. Rawlins, T. E., and James Johnson. Cytological studies of the mosaic disease of tobacco. Amer. Jour. Bot. 12: 19-32. 1925.

15. Russell, H. L., F. B. Morrison, and W. H. Ebling. Apparently healthy plants produce mosaic disease. In New pages in farm progress. Wisconsin Agr. Exp. Sta. Bul. 373 (Ann. Rept. Director 1923/24): 3-8. April 1925.

16. Walker, M. N. Studies on the mosaic disease of Nicotiana glutinosa. Phytopath. 15: 543-547. 1925.

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL. (CACONEMA RADICICOLA (GREEF) COBB)

Rootknot was reported to be of considerable importance locally in eastern North Carolina, in the Coastal Plain and Sand Hill regions of South Carolina, and throughout the Coastal Plain of southern Georgia, causing serious reduction in both yield and quality. In North and South Carolina a spotting of the leaves was attributed to the low vitality caused by the disease.

North Carolina: Rootknot of tobacco was rather prevalent in eastern North Carolina during 1925, especially in one locality where the plants were affected to the extent of approximately 80 per cent. The owner of one of these fields had threatened one of the fertilizer concerns with a law suit on account of a spotting of the leaves which he attributed to the fertilizer he had used. I am inclined to believe that rootknot of tobacco may bring about a spotting of the leaf through a loss of vitality on the part of the plant. We have no experimental data concerning this, however. (Fant, Jan. 18, 1926)

Georgia (southern): Very important in entire flue-tobacco district; throughout the Coastal Plain where tobacco is grown. Loss 35 per cent. Favorable temperature and sufficient moisture for vigorous infection in April and May, and during dry weather of May and June infected plants suffered seriously due to obstruction of water and nutrients, resulting in low quality. (Boyd)

LEAFSPOTS OF NON-PARASITIC OR UNDETERMINED CAUSE

Ringspot (undet.) was reported from Maryland and Wisconsin, as follows:

Maryland: More found in Maryland in 1925 than in any other year. In one field 75 per cent of the plants were affected. Some was present in practically every field inspected. (Jehle)

Wisconsin: A disease probably of physiological origin occurred frequently in portions of fields and caused considerable concern. Disease practically new to Wisconsin. Plants usually recovered so that only 3 to 5 leaves per plant were damaged, by becoming ragged. Cause could not be determined. (Johnson)

Drought spot. "This is becoming very general in Virginia in sections where there has been a marked deficiency in rainfall, especially in Appomattox and Halifax Counties. It is characterized by the burning of leaf margins and the development of large single or fused spots in the intercostal regions." (Fromme, Sept. 15)

Leafspot, determined by Johnson to be non-parasitic although Alternaria sp. was present, was reported by Boyd as occurring throughout the flue-cure district of southern Georgia, where it caused a loss estimated at 5 per cent. Boyd states that it was especially important where tobacco followed tobacco, and was most severe on impoverished plants, especially those affected by rootknot, It occurred also as a stalk-spot.

A concentrically zonate spotting of tobacco leaves was reported by Fant as very prevalent in fields in the southeastern portion of North Carolina. A Macrosporium species was associated, but according to Fant there was doubt as to its pathogenicity.

Rust (physiological injury following mosaic). Connecticut.

OTHER DISEASES

Ascochyta nicotiana Pass. ?, leafspot. Material collected in Tennessee in 1924 was determined by Miss Anna E. Jenkins of the Bureau of Plant Industry as probably this fungus, which had apparently not been reported for this country previously.

Aspergillus niger Tiegh., canker, was reported by Anderson as causing occasional bad crops in Windsor and Suffield, Connecticut.

Bacillus carotovorus Jones, hollow stalk, was found in several fields in Connecticut and in one field in Maryland in 1925. A few scattered cases were also reported by Slagg and Major from Canada, in Ontario and Quebec, but only in one field where about 5 per cent of the plants were affected was the injury at all severe.

Bacterium solanacearum EFS., bacterial wilt, reported in destructive form from several counties in Virginia. Evidently more prevalent than usual as a result of the hot, dry season. (Fromme)

Cercospora nicotianae Ell. & Ev., frogeye. Southern Georgia, Florida and Porto Rico. In southern Georgia it was important due to general lack of vigor caused by drought and rootknot, and caused a loss estimated by Boyd at 5 per cent.

Corticium vagum Berk. & Curt. Reported to have been present to a considerable extent in seed beds in New Mexico; also caused damping-off in Wisconsin but was unimportant.

Fusarium oxysporum nicotianae Johnson, wilt, caused considerable injury in local areas in Maryland, where it was more prevalent than usual. (Temple & Jehle)

Phyllosticta nicotianae Ell. & Ev., leafspot, Porto Rico.

Phytophthora nicotianae (Speg.) Van Breda de Haan, black shank, was reported by Boyd from three counties in southern Georgia, and from Florida by Tisdale, who said, "General in appearance, causing reduction in yield of approximately 10 per cent. The acreage of cigar wrapper tobacco this year was only about one-third that of 1924. Most of the plantings were on new land, hence the reduction in loss from black shank."

Pythium debaryanum Hesse, Connecticut and Wisconsin.

Brown rootrot (undet.), occurred in Connecticut. Clinton and Anderson state that experiments have shown that it can be greatly lessened by soil treatment with steam or formalin. Johnson reported from Wisconsin as follows "Tobacco on sod failed to grow properly in about 90 per cent of the cases. The roots frequently rot. Timothy sods are worst. A soil toxin may be concerned. About 20 per cent of the fields in Wisconsin are more or less affected in this manner."

Curly dwarf. A few scattered instances were observed in Ontario, Canada. (Slagg & Major)

Damping-off. "Quite common in the Quebec districts and in parts of the Ontario district. As a result of improved methods of seedbed management in Quebec, the disease was not as prevalent as in previous years." (Slagg & Major)

Frenching (undet.). Serious in a few fields in Housatonic Valley, Connecticut. (Clinton & Anderson)

Injury due to tarvia fumes, a few cases in Connecticut. "Where hot tarvia was applied to roads the fumes blew over on the tobacco leaves and made them appear as if varnished. Spots later developed on some of the leaves." (Anderson)

Lightning injury. About six cases occurred in Connecticut. The plants were killed in spots 15 to 50 feet across. (Clinton & Anderson)

Recent literature:

1. Adam, D. B. The blue mold (Peronospora) disease of tobacco. Jour. Dept. Agr. Victoria 23: 436-440. July 1925.

2. Cooper, Thomas. Tobacco brown root-rot. Ann. Rept. Director Kentucky Agr. Exp. Sta. 37 (1924): 29-30. 1925.

3. Garner, W. W. A new tobacco disease. Better Crops 4 (4): 17-18. June 1925.

4. Major, T. G. Report on tobacco disease investigations. Canada Dept. Agr. Exp. Farms Tobacco Div. Rept. 1923: 38-41. 1925.

DISEASES OF SUGAR CANE

MOSAIC (UNDETERMINED)

Mosaic was reported from Georgia (loss 2 per cent), Florida, Alabama, Mississippi, Louisiana, Porto Rico, and the Hawaiian Islands in 1925. Louisiana reported more than last year and more than average. Other reports are:

Florida: Causing considerable damage in western part of state. Areas quarantined against movement of diseased material. (Weber)

Georgia: Mosaic is common in the susceptible varieties in Decatur, Grady, Thomas, Colquit, Brooks, Tift, and Worth Counties. Most of the larger plantings for syrup are planted to the resistant varieties. Less important this year than drouth and rootknot. (Boyd)

Mississippi: Mosaic disease of sugar cane continues serious in about 18 counties in south Mississippi. Cayana and several Java seedlings are being imported into the state with the hope of introducing immune varieties for combatting the disease. (Neal)

Hawaiian Islands: Mosaic disease occurs on islands of this group. Of the 43 plantations, however, 21 are commercially free of the disease. Losses of sugar from mosaic disease in the 1925 crop are as follows:

	A maximum estimate
Island of Kauai	50 Tons
" " Oahu	900 "
" " Hawaii	1930 "
" " Maui	1710 "
Total for all Islands	4590 Tons

This is a loss on our total crop of 725,000 tons, or less than seven-tenths of one per cent and about one-half of the estimated losses for the 1920 and 1921 crops which you quoted. We can conservatively say that losses from mosaic disease are on a downward curve in these Islands rather than an upward trend. Much of this reduction in losses from mosaic disease can be attributed to the educational work of Kunkel and Lyon and the extension of areas planted to the varieties H 109 and D 1135, which with us are both resistant to infection and to some degree tolerant of the disease once infected. It is interesting to note that the plantations which grow the extremely susceptible canes are more nearly mosaic free than those which grow the varieties which are more tolerant to the disease. (Lee)

Porto Rico: Very common and in some cases severe. Has been brought under control by roguing and by the use of resistant varieties. (Cook & Tucker)

Recent literature:

1. Alfaro, J. A new method of fighting the propagation of mosaic disease in sugar cane. Plant. & Sugar Manuf. 75: 388-389. Nov. 14, 1925.

2. Altson, R. A. The spread of cane mosaic in the West Indies. (Jour. Bd. Agric. British Guiana.) Intern. Sugar Jour. 27: 293. 1925.

3. Ashby, S. F. Behaviour of some varieties of cane to mosaic disease in the Hawaiian Islands. Trop. Agriculture 2: 132-134. June 1925.

4. ----------- Sugar-cane mosaic. Rept. Proc. Imp. Bot. Conf. London, 1924: 122-131. 1925.

5. Asuncion, S. Mosaic disease and its effect on the sugar industry in the Philippine Islands. Philipp. Agr. Rev. 18: 33-38. 1925.

6. Chardon, C. E. Sobre la enfermedad del 'mosaico' o 'matizado' de la cana de azucar. (On the mosaic disease of sugar cane.) Rev. Agr. Puerto Rico 14: 188-197. 1925.

7. East, Edward M., and Wm. H. Weston. A report on the sugar cane mosaic situation in February, 1924, at Soledad, Cuba. Contribut. Harvard Inst. Trop. Biol. and Med. 1: 1-52. Harvard Univ. Press: Cambridge, 1925.

8. Edgerton, C. W., and W. G. Taggart. Tolerance and resistance to the sugar cane mosaic. Plant. & Sugar Manuf. 74: 188-190. March 7, 1925.

9. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

10. Johnston, J. R. Control of sugar cane mosaic. Plant. & Sugar Manuf. 74: 190-191. March 7, 1925.

11. Kopp, A. La mosaique de la canne à sucre. Son apparition aux Antilles françaises. Quelques faits nouveaux. Rev. Bot. Appl. 5: 411-417. June 1925.

12. ----------- La mosaique de la canne à sucre (concl.). Rev. Bot. Appl. 5: 519-526. July 1925.

13. Menendez Ramos, R. Mosaic disease and methods of control. Plant. & Sugar Manuf. 75: 487-489. Dec. 19, 1925.

14. Redpath, W. H. A planter's experience with mosaic disease and the planting of Uba cane. Jour. Jamaica Agric. Soc. 29: 18-21. 1925.

15. Shepherd, E. F. S. Mosaic disease serious in Reunion. South African Sugar Jour. 9: 97, 99, 101. 1925.

16. Storey, H. H. Sugar-cane diseases of the mosaic type in South Africa. II. Jour. Dept. Agr. South Africa 10: 532-537. June 1925.

REDROT CAUSED BY COLLETOTRICHUM FALCATUM WENT.

Although reported general from Georgia, Florida, Louisiana, and Porto Rico, redrot was considered relatively unimportant in the growing cane. It continues to cause considerable destruction of planted or windrowed seed cane.

Florida: Most common disease of the cane in Florida, found almost everywhere cane is grown. The damage is slight however. (Weber)

Georgia: Less prevalent in spring due to dry April and May; light infection of canes later in season probably due to dry summer. (Boyd)

Recent literature:

1. Cottrell-Dormer, W. Red rot in sugar cane. Australian Sugar Jour. 16: 734-735, 737. 1925.

ROOTROT DUE TO VARIOUS FACTORS

Rootrot troubles attributed to various causes were reported from Louisiana, Georgia, Porto Rico, and Hawaii in 1925. Some of the organisms which were reported as associated with rootrot are Marasmius sacchari Wakker, Rhizoctonia sp., Pythium sp., Sclerotium rolfsii Sacc., and Thielaviopsis paradoxa (de Seyn.) Hoehn. In Louisiana losses from rootrot were estimated at 5 to 10 per cent. Tims reported that "While damage was not nearly so serious as last year, the disease was still one of the most serious troubles of sugar cane." The importance of root-eating snails and centipedes in connection with rootrot in Louisiana has been brought out by R. D. Rands. In Georgia, according to Boyd rootrots were usually accompanied or followed by redrot and rootknot. From Hawaii Lee reported as follows:

> "The symptoms causing what have been known as Lahaina disease have been found sufficiently distinguishable to identify three different types of Lahaina disease or as it has been sometimes called, root rot.
>
> "The use of the term growth failure is now believed to be preferable to either the term Lahaina disease or root rot. The type of growth failure occurring on the windward slope of acid soils we have called Hamakua growth failure. This type has been shown in pot tests with adequate replications to be non-infectious. The Chemistry Department have shown the presence of a high content of aluminum salts in such soils and pot tests with adequate

replications have shown that aluminum salts can reproduce the growth failure symptoms. One of the plantations has secured remarkable recovery from such aluminum growth failure in field tests by high applications of potash fertilizers to the soil. Similar results are reported by Hoffer in aluminum growth failure of corn. This treatment is also now in plantation practice."

According to the results of investigations in Hawaii mentioned by Lee, and reported by McGeorge (7-10), aluminum and other toxins are a very important factor in the rootrot problem.

Recent literature:

1. Bird, Maurice. Soil hygiene in its relation to cane "disease". Internat. Sugar Jour. 27: 423-424. Aug. 1925.

2. ----------- Soil hygiene in its relation to cane "disease." Second communication. Internat. Sugar Jour. 27: 536-537. Oct. 1925.

3. Bourne, B. A. Morphological similarity between the Pythium-like fungus found associated with diseased sugar-cane roots in Hawaii and Porto Rico. Jour. Dept. Agric. Porto Rico 8: 61-70. 1925.

4. Cook, M. T. Diseases of the roots of sugar cane. Study of root diseases relatively backward - the principal root diseases known in Porto Rico. Facts About Sugar. 20: 425. May 2, 1925.

5. ----------- Enfermedades de la raiz de la cana de azucar. (Sugar cane root diseases.) Rev. Agric. Puerto Rico 14: 245-246. 1925.

6. Earle, F. S. Sugar cane root diseases ...... Facts About Sugar. 20: 882. Sept. 12, 1925.

7. McGeorge, W. T. A discussion of the root rot problem. Hawaiian Plant. Rec. 29: 167-173. April 1925.

8. ----------- An illustration of aluminum injury to sugar cane. Hawaiian Plant. Rec. 29: 398-399. Oct. 1925.

9. ----------- The influence of aluminum, manganese and iron salts upon the growth of sugar cane, and their relation to the infertility of acid island soils. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Agr. & Chem. Ser. 49: 95 pp. July 1925.

10. ----------- The root rot problem of sugar cane. Studies in toxic conditions and causes - The relation of potash to disease resistance. Facts About Sugar. 20: 730-732. Aug. 1, 1925.

11. Rands, R. D. Snails as predisposing agents of sugar cane "root disease" in Louisiana. Jour. Agr. Res. 28: 969-970. 1924.

12. ---------- Root disease of sugar cane in Louisiana. U. S. Dept. Agr. Circ. 366: 1-20. 1926.

13. Shepherd, E. F. S. La maladie de la racine de la canne. Rev. Agr. Ile Maurice. 1925: 418-420. March-April 1925.

14. Stewart, G. R. The relation of root injuries to root failure in Lahaina cane. Hawaiian Plant. Rec. 29: 400-409. Oct. 1925.

15. Veret, J. A. The root system of sugar cane. Hawaiian Plant. Rec. 29: 350-358. Oct. 1925.

EYESPOT CAUSED BY HELMINTHOSPORIUM SACCHARI BUTLER

Eyespot was reported to be very destructive on seedlings and on rattoon of some varieties throughout Porto Rico. It is severe on the variety H 109 in favorable situations in Hawaii, according to Lee, who states:

> "Of the commonly grown varieties in these islands all are commercially resistant to eyespot with the exception of H 109. H 109 is, moreover, free of the disease in 85 per cent or more of the areas on which it is planted, but on the northern slopes of all islands, with lessened daylight and consequently very long hours of dew on the leaves, eyespot causes appreciable losses on this one susceptible variety.
>
> "On this variety in weather favorable for the disease, the eyespot lesions run up the leaves, forming broad streaks sometimes to a length of two or three or even four feet. In severe outbreaks the lesions run down into the growing point of the cane and a top rot results. In a few severely affected fieldscounts of sticks affected with such a top rot have been made. In the worst fields observed 38.6 per cent of the stalks had been killed back by top rot. In a more nearly representative field for the affected locality, 13.8 per cent of the stalks showed a top rot. It is for this reason that eyespot, which in most countries and on most varieties, is a disease of almost negligible importance, is with us only secondary to mosaic disease in causing loss of cane and sugar. We do not wish to draw a picture of devastation, however. Only three plantations on the northern slopes of these islands grow H 109 extensively and on these plantations severe infection is confined only to those areas where air movement in the fields is poor and hours of sunlight are short.
>
> "H 109 gives such high yields of sugar per acre that even with small areas affected with eyespot it outyields the resistant varieties at present available under the conditions of these plantations."

Recent literature:

1. Cook, M. T. Studies on Helminthosporium sacchari on sugar cane in Porto Rico. (Abstract) Phytopath. 16: 71. Jan. 1926.

2. Halma, F. F., and H. S. Fawcett. Relation of growth of Helminthosporium sacchari to maintained temperatures. Phytopath. 15: 463-469. 1925.

ROOTKNOT CAUSED BY HETERODERA SP.

Boyd reported rootknot from Georgia as follows:

> "The root disease survey was not started until the latter part of October. A surprising amount of rootknot was met with in both the severely and lightly drought-affected areas. Where there existed heavy, more or less uniform infestation of the soil, the entire field would show marked stunting. Fields with only spotted infestation could be recognized easily by the local stunted spots of cane. The most severe case seen was in a one-acre field in Worth County, which was a total loss for syrup. This field was in a creek bottom with more than the usual amount of moisture available throughout the summer, yet the cane grew no more than 2 to 4 feet high. The soil is loose and sandy, with a heavy nematode infestation, judging from the severe infection of cotton on three sides of the cane field. This was the first time cane had been planted there. Numerous hills of Cayana 10 scattered throughout the field attained nearly normal height. The severely affected variety was the so-called 'Red' cane. The galls ranged in size from minute knots on the fine fibrous roots to enlargements one-fourth inch in diameter on the larger roots. The galls of more recent development were gorged with larvae, eggs, and females in various stages of development. Males were less common. The species is undoubtedly H. radicicola."

Heterodera sp. causing rootknot was reported from Porto Rico by Matz (see references), who has found it occurring in loose more or less sandy soils in widely separated areas in southern Porto Rico since the summer of 1924.

Recent literature:

1. Matz, J. Root knot of sugar cane in Porto Rico. Disease associated with nematode infestation found in sandy soils of Island's south coast. Facts About Sugar 20: 1193-1194. Dec. 12, 1925.

2. ----------- Root knot of sugar cane in Porto Rico. Phytopath. 15: 559-563. 1925.

3. Matz, J. Root knot on sugar cane in Porto Rico. Plant.& Sugar Manuf. 76: 9. Jan. 2, 1926.

OTHER DISEASES AND INJURIES

Bacterium vascularum Cobb, gumming disease, occurred in a few localities in Porto Rico.

Cercospora vaginae Krueger, red spot of leaf sheath, was reported from Porto Rico.

Gnomonia iliau Lyon, iliau. Hawaii (negligible).

Leptosphaeria sacchari van Breda de Haan, ringspot, was said to be common in Florida during the fall, causing considerable firing of the older leaves. In Porto Rico and Hawaii it was reported to be unimportant.

Melanconium sacchari Mass., rind disease. Louisiana and Porto Rico.

Phyllosticta sacchari Speg., leafspot. Porto Rico.

Phytomonas rubrilineans Lee et al., bacterial red stripe, is reported from Hawaii (7). The disease is similar to that caused by Bacterium panici Elliott on proso millet in the United States, but inoculations with each organism on the host of the other gave only negative results. Concerning its occurrence in 1925, Lee makes the following statement:

> "This disease which had previously been known only in a small district on the Island of Hawaii, has been found during 1925 on the Island of Kauai and has apparently existed there for several years. Under the dry conditions of the irrigated plantations where it occurs, it was so negligible as to escape attention by the plantation staffs. The Tip varieties are the only susceptible varieties grown in these islands. It is so widespread on Kauai and of such negligible importance there that eradication was decided against. The disease has not yet been observed on the Islands of Oahu or Maui."

Thielaviopsis paradoxa (de Seyn.) Höhn., pineapple disease. Porto Rico (common but not serious); Hawaii (negligible).

Drought injury. "Caused the greatest loss in years in Georgia, yet where the land was prepared and cultivated best, the crop made surprising progress. Many fields, however, are practically a total loss for syrup and are used for fodder and grazing. A large percentage of the apparently well developed cane is pithy. Probable loss, around 40 per cent." (Boyd)

Non-parasitic diseases occurring in Hawaii were reported by Lee, as follows: (see also root rot):

> "Of the non-infectious diseases there are two types of chlorosis, one occurring on cane of all ages on limestone soils, and the other on young ratoons. The second type is being prevented by prompt irrigation following harvesting and early nitrogen applications. The first type is being alleviated by iron sulphate dust applications, and this method is being used commercially. There have been but negligible losses from both types of chlorosis during the past year.
>
> "A non-infectious disease of cane called Pahala blight, which occurs on only one plantation on a leeward arid slope

has been effectively controlled by the Chemistry Department here, with sulphur applications to the soil; also the cane is found to recover following applications of manganous sulphate as a dust. These results with one or two other clues point to the inference (inference only) that a manganese deficiency is the cause of this Pahala blight, analogous to the manganese deficiencies produced in cultures by McHargue in Kentucky."

Recent literature:

1. Ashby, S. F. Three serious cane diseases not yet reported from the British West Indies. Proc. West Indian Agr. Conf. 9 (1924): 84-89. 1925.
   Gumming, Fiji disease, leaf stripe (Sclerospora).

2. Barber, C. A. Streak disease on Uba cane in Natal. Intern. Sugar Jour. 27: 472-479. Sept. 1925.

3. Cook, M. T. Enfermedades de la mancha de la hoja de la cana de azucar. (Leafspot diseases of sugar cane). Rev. Agr. Puerto Rico 14: 185-187. 1925.

4. ----------- Leaf spot diseases of sugar cane. Nature of leaf spot infections and their causative organisms. The principal leaf spot diseases. Facts About Sugar 20: 234. March 7, 1925.

5. ----------- Sugar production and cane diseases. Extent of losses from disease inadequately realized - Economic effects of reduced production. Facts About Sugar 20: 1068-1069. Nov. 7, 1925.

6. Dodds, H. H. Treatment of streak and mosaic diseases. South African Sugar Jour. 9: 593-599. Sept. 1925.

7. Hawaiian Sugar Planters' Association - Experimental station - Dept. Plant Path. - Red-stripe disease studies. Honolulu, Sept. 1925.
   Articles by H. A. Lee, J. P. Martin, Helen A. Purdy, C. C. Barnum, W. C. Jennings, and D. M. Weller.

8. Lee, H. A., J. P. Martin, and C. C. Barnum. A report on mechanical methods in dusting cane fields. Hawaiian Plant. Rec. 29: 377-384. Oct. 1925.

9. Storey, H. H. Streak disease, an infectious chlorosis of sugar-cane, not identical with mosaic disease. Rept. Proc. Imp. Bot. Conf. London, 1924: 132-144. 1925.

10. ----------- Streak disease of sugar-cane. Plant. & Sugar Manuf. 75: 168-169. Aug. 29, 1925.

11. ----------- Streak disease of sugar-cane pt. II. Plant & Sugar Manuf. 75: 188-191. Sept. 5, 1925.

12. Storey, H. H. Streak disease of sugar-cane. Sci. Bul. Dept. Agr. South Africa 39: 39 pp. 1925.

13. Yoder, P. A. Hot-water treatment of dormant and sprouted seed cane. Intern. Sugar Jour. 27: 359-361. 1925.

14. ---------- Hot-water treatment of dormant and sprouted seed cane. U. S. Dept. Agr. Circ. 337: 1-3. 1925.

DISEASES OF SUGAR BEET

CURLY-TOP (UNDETERMINED)

Collaborators reported the following percentages losses from curly-top: New Mexico, 20; California, 15; Idaho, 8; Washington, 5; and Arizona, a trace.

Eubanks Carsner of the Bureau of Plant Industry has submitted the following statement concerning the importance of curly-top in 1925:

> "In regard to the beet disease situation in California and the intermountain region of the Northwest, I may say that taking the situation as a whole curly-top was again by far the most serious disease during the past season. This despite the fact that in Idaho and Utah where last year the damage was enormous, the crop this year was less affected than has been true for a number of years. In California the season of 1925 was the most serious for curly-top that has been experienced for many years. The central part of the state especially was affected, and the delta region of the San Joaquin and Sacramento Rivers experienced such a bad outbreak that the yield was reduced from that of previous years by more than 50 per cent. This region has heretofore been relatively free from the disease even in seasons when it was severe elsewhere in the state."

Carsner has reported that some progress has been made in the selection of sugar beets for curly-top resistance (2).

Recent literature:

1. Carsner, Eubanks. Spring infection of sugar-beet leafhoppers with curly top virus. U. S. Dept. Agr. Official Record 4 (34): 3. Aug. 26, 1925.

2. ----------- Resistance in sugar beets to curly-top. (Abstract) Phytopath. 16: 87-88. Jan. 1926.

3. ------------ and C. F. Stahl. Studies on curly top disease of the sugar beet. Facts About Sugar 20: 230-233, 254-256, 278-280, 281. 1925. (Reprinted from Jour. Agr. Res. 28: 297-320. April 26, 1924).

4. Carsner, Eubanks. Attenuation of the virus of sugar beet curly top. Phytopath. 15: 745-757. Dec. 1925.

NEMATODE, HETERODERA SCHACHTII SCHMIDT

The following losses were estimated by collaborators to have been caused by the sugar-beet nematode in 1925: New Mexico and California, 5 per cent; Arizona one per cent; Idaho, a trace.

The present distribution of the sugar beet nematode as determined by Gerald Thorne (Office of Sugar Plant Investigations; 6) is as follows:

> "California: The principal beet-growing areas adjacent to the following sugar factories are generally infested: Chino, Los Alamitos, Santa Ana, Los Angeles, Oxnard, Betteravia, Spreckels, and Salinas. A few fields are known to be infested near Lompoc, Alvarado, and Pleasanton.
>
> "Utah: Many fields are infested in the territory supplying the factories at Smithfield, Lewiston, Logan, Brigham, Ogden, Hooper, West Jordan, Lehi, Springville, Spanish Fork, Salt Lake City, Provo, and Payson, while a few infestations are known at Cornish, Garland, Layton, Moroni, and Richfield.
>
> "Idaho: A few infested fields are known near Sugar City, Idaho Falls, Preston, and Blackfoot. The territory supplying the Whitney factory is generally infested.
>
> "Colorado: No part of this state is seriously infested. In the northern section about 175 fields are known to be, distributed among the following factory districts: Fort Collins, Windsor, Eaton, Greeley, Loveland, Longmont, Fort Morgan, Brush, Julesburg, and Sterling. In the Arkansas Valley scattering infestations are known at many points between Pueblo and the Kansas line with the greater numbers at Vineland, Avondale, Manzonola, Rocky Ford and Sugar City.
>
> "Nebraska: Only two fields in this state are known to be infested. These are located in Gering.
>
> "Montana: A single infested field is located near the Billings factory."

Thorne predicts that unless precautionary measures are taken the entire western beet growing districts will become infested with the parasite. Steiner (3) records some interesting observations and deductions regarding the host preferences and host selection mechanism of this and other plant-parasitic nemas. The host preference of a particular nema "population" is determined by the previous host history, the plant on which the parents lived being preferred more and more strongly as the number of generations of specialization increases.

Buckhurst (1), and Strachan and Taylor (4), report that an eelworm very similar to if not identical with Heterodera schachtii is of some importance on potatoes in England, where it is called "potato eelworm" and has been paid increasing attention during the past ten years. Some preliminary experiments conducted by Buckhurst on a very small scale indicated that this particular race would not attack beets.

It is reported that in Utah H. schachtii has been found to be attacked by several species of predacious and parasitic nematodes (5).

Recent literature:

1. Buckhurst, A. S. Notes upon bulb mites and eelworms. Jour. Min. Agr. Great Britain 32: 734-738. Nov. 1925.

2. Semichon, L. Sur l'anguillule de la betterave: Heterodera schachtii, Schmidt, dans les tubercles provenant du Maroc. Rev. Path. Veg. & Entom. Agr. 12: 40-43. Jan.-Mar. 1925.

3. Steiner, G. The problem of host selection and host specialization of certain plant-infesting nemas and its application in the study of nemic pests. Phytopath. 15: 499-534. Sept. 1925.

4. Strachan, J., and T. H. Taylor. Potato eelworm. Jour. Min. Agr. Great Britain 32: 941-947. Jan. 1926.

5. Taylor, W. A. Report of the Chief of the Bureau of Plant Industry for the fiscal year ended June 30, 1925. 36 pp. 1925.

6. Thorne, Gerald. The control of the sugar beet nematode. U. S. Dept. Agr. Farmers' Bul. (In press)

LEAFSPOT AND ROOTROT CAUSED BY PHOMA BETAE (OUD.) FRANK

Losses reported as due to Phoma betae in 1925 are: Idaho, 2 per cent; Wisconsin, one per cent; Louisiana (leafspot), Kansas (leafspot), and Washington each a trace. Reports of its occurrence were received from Ohio, Minnesota, and California also. Undoubtedly Pythium, Rhizoctonia and perhaps other fungi are concerned also in the losses reported as due to rootrot.

Louisiana: Phoma betae leafspot appeared in the planting of sugar beets on the University Experiment Station farm, and was quite severe on May 20. This is probably the first report of this disease in Louisiana. (Edgerton & Tims)

Ohio: In a general survey of the sugar beet section of the state it was found that black root was quite generally distributed and causing heavy losses. On the 50,000 acres originally planted to sugar beets, 5,000 to 8,000 have been replanted to other crops, largely on account of Phoma. The unfavorable growing conditions during May and June were partially responsible for the severe epidemic. However, the disease is becoming more severe from year to year and at present in some sections no attempt is being made to grow sugar beets. In a careful check-up, it was found that the epidemic did not have its source on the seed. (Plant Pathologists of Agr. Exp. Sta. for Northern Ohio, August).

California: A rootrot, which is probably due in the main to Phoma, was noted in several fields in the vicinity of Santa Ana, and in these caused considerable damage. (Carsner).

Most of the references given below discuss beet seed-treatment, mostly for the control of rootrot, with various substances, including mercuric chloride (6), sulfuric acid (6, 9), formalin (5), copper sulfate (5, 6), segetan (4), betanal (1, 2, 4), uspulun (2, 4, 5), and germisan (2, 4, 5, 8).

The occurrence of the disease in Utah has been found to be correlated with drought late in June and July, according to Richards (7). Rambousek (6) concludes that the disease as it occurs in Czecho-Slovakia is associated with a type of soil that contracts during periods of drought. He states, also, that heart rot is always accompanied by bacteria, principally Micrococcus spp., and that attempts to reproduce it with pure cultures of P. betae were failures, although the leaves and young seedlings were inoculated readily. Gäumann (3), working in Switzerland, reports the results of experiments and observations from which he concludes that the cause of heart rot is primarily physiological and secondarily parasitic. He states that P. betae is capable of infecting only plants grown on markedly alkaline soils (pH 7.8). Negative results only were secured in inoculations on plants grown in soil at pH 6.6. The disease was in no case observed to occur on acid soils.

Recent literature:

1. Baunache. Pflanzenschutzmittel u. -geräte. Betanal. Die Kranke Pflanze 2: 103-104. 1925.

2. Esmarch. Der Wurzelbrand der Rüben. Die Kranke Pflanze 2: 62-64. 1925.

3. Gäumann, E. Untersuchungen über die Herzkrankheit (Phyllonekrose) der Runkel- u. Zuckerrüben. Vierteljahrsschr. Naturforsch. Ges. Zürich 70, Beibl. 7: 106 pp. 1925.

4. Kotthoff, P. The influence of sugar ball treatment upon the yield of the sugar beet. (Transl. title). Landwirtschaftliche Zeitung, No. 15, April 1925, pp. 190-191.

5. Neuweiler, E. Bericht uber die Tätigkeit der Schweizerischen Landwirtschaftlichen Versuchsanstalt Oerlikon in den Jahren 1920-1923. LV. Pflanzenschutz. Landw. Jahrb. der Schweiz 39: 252-260. 1925.

6. Rambousek, F. Berichte des Forschungs-Institutes der csl. Zucker-industrie. CDXVII. Die Rübenkrankheiten in der Cechoslovakei 1923. Zeitschr. Zuckerind. (Prague) 49: 197-201. 1925.

7. Richards, B. L. Plant pathology. In Utah Agr. Exp. Sta. Bul. 192 (Bienn. Rept. Director 1923/24): 58-61. 1925.

8. Winterhalter, W. K. Treatment of beet seed. The use of germisan to prevent disease and stimulate growth. Facts About Sugar 20: 329. April 4, 1925.

9. Zwoboda, and H. Bauer. Ein Beitrag zum Beizen des Zuckerrubensamens nach dem Verfahren von Hiltner. Zeitschr. Zuckerind. (Prague) 49: 207-209. 1925.

ROOTROT CAUSED BY RHIZOCTONIA SP.

The Rhizoctonia rootrot (dry rot, crown rot) was reported to the Survey only from Ohio, Kansas, and Colorado in 1925. In Kansas, according to White, its occurrence was general, but it caused only a trace of loss. In Ohio it was noted to be most severe on acid soils. Stewart (Office of Sugar Plant Investigations) reported that in Colorado "In some fields the loss was 77 per cent, and many fields showed 25 per cent. Rhizoctonia was the only organism constantly associated with rot in the Rocky Ford district."

LEAFSPOT CAUSED BY CERCOSPORA BETICOLA SACC.

According to G. H. Coons, the Cercospora leafspot caused a loss of 3 per cent in Colorado in 1925. Other percentage losses reported were: Iowa, 2; Wisconsin, 1; Louisiana, Kansas, and Idaho, traces. The disease was reported also from Ohio, Wisconsin, and California.

Colorado: Slightly less prevalent than usual, less than last year. Epidemic in the Arkansas Valley, but unimportant elsewhere. Temperature conditions are always favorable in Colorado. It caused greatest injury between August 15 and September 15, when the beets were approaching maturity. In a test of nearly 500 strains no commercial variety or strain showed any resistance or tolerance. (Coons)

California: Cercospora leafspot was noted only in southern California. It caused less damage than it has in other years. (Carsner)

OTHER DISEASES

Actinomyces scabies (Thax.) Güssow. Scab occurred in Idaho, but was unimportant, according to Hungerford.

Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) The rootknot nematode caused a loss of 2 per cent in California, according to Milbrath.

Sclerotium rolfsii Sacc. Louisiana.

Septoria betae West. Septoria leafspot was of considerable importance in Ohio, according to H. C. Young.

Mosaic (undet.) was reported by Durrell to be prevalent in some fields in the Arkansas Valley in Colorado.

Recent literature:

1. Salmon, E. S., and W. M. Ware. Downy mildew of mangold and beet. Jour. Min. Agr. Great Britain 32: 833-838. Dec. 1925.

   Sugar beet culture is becoming of increasing importance in Great Britain. The first authentic record of this fungus in the country was on sugar beet in 1921. It is capable of causing considerable damage if allowed to become established.

DISEASES OF OTHER CROPS

ARTICHOKE (JERUSALEM)

Powdery mildew (undet) was reported from Indiana.

ASPARAGUS

RUST CAUSED BY PUCCINIA ASPARAGI DC.

Rosa sent the following report from California:

> "Rust was much more severe than usual in 1925. There was a severe outbreak in the Delta and Sacramento River districts, especially on young plantations that were not cut later than April 1. The reduction in yield will be evident next year and in succeeding years. There was probably 15 per cent gross injury. The Washington strains proved somewhat resistant but by no means immune, while Palmetto and Argenteuil were very susceptible."

Milbrath reported a loss of 2 per cent for California, but stated that the injury would be difficult to estimate until the 1926 crop.

The disease was said by Fenner to be important locally in South Carolina on spring-sown seedling plants. In other states reporting it rust was of no importance. Nelson stated that in Michigan, "Rust appeared late this year in susceptible varieties and caused no great damage. Washington strains were not affected at all." A similar report was received from New Jersey.

OTHER DISEASES AND INJURIES

Cercospora caulicola Wint., Florida.

Rhizoctonia sp., stem rot, South Carolina.

Sclerotinia spp., rot. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

Alkali injury, Washington.

BEET (GARDEN)

Leafspot caused by Cercospora beticola Sacc. was rather generally reported from the eastern and southern states but was not very important. It was also reported from Porto Rico.

Scab caused by Actinomyces scabies (Thax.) Gues. was reported from New Jersey, Virginia, and Washington.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) was said by Taubenhaus to be prevalent in light sandy loams, causing a loss of one per cent, in Texas. White reported that one field in Kansas was a total loss due to this disease. Peaches on the same land had been killed by rootknot in 1924.

Leafspot caused by Phoma betae (Oud.) Frank was common in New York, according to Felix.

Rootrot caused by Rhizoctonia sp. was observed to be serious in one garden in Floyd County, Indiana, (Gardner)

Damping-off (Pythium sp. ?). "Fall crop in Western Branch (Norfolk Suffolk) section of Virginia frequently attacked." (McWhorter)

Stemrot caused by Sclerotium rolfsii Sacc. Texas.

Damping-off (undet.). Virginia (McWhorter), Washington.

CARROT

Rot caused by Sclerotinia sclerotiorum (Lib.) Mass. was reported by Chupp from New York as follows, "Abundant during the latter part of the season, worse on early carrots pulled late. Soil moisture conditions were ideal for its development. According to Felix, carrots provided ideal conditions for apothecial production and the formation of new sclerotia, and the length of time this crop remains in the field is thought to be a big factor in controlling the disease."

Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

Leafspot caused by Cercospora apii carotae Pass. New York, "Probably part of the leaf blight which is supposed to be due to Macrosporium is Cercospora. It never does much injury in this state." (Chupp). Gardner reported it as serious locally in Indiana.

Softrot caused by Bacillus carotovorus Jones was reported from Connecticut, "One report; caused considerable injury after wet weather in this field." (Clinton), and New York, where it was common in some storage houses, according to Chupp.

Black rot caused by Alternaria radicina Meier, Drechs., & Eddy was common in New York on carrots in storage. (Chupp).

Stemrot caused by Corticium vagum Berk. & Curt. Common in some fields in New York. (Chupp).

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb). Missouri, Washington.

Leaf blight caused by Macrosporium carotae Ell. & Langl. New York, Porto Rico.

Rot caused by Sclerotium rolfsii Sacc. Louisiana.

CASSAVA

Leafspot caused by Cercospora sp. Porto Rico.

EGGPLANT

LEAFSPOT AND FRUIT ROT CAUSED BY PHOMOPSIS VEXANS (SACC. & SYD.) HARTER

Both the leafspot and the fruit rot were reported from southern Georgia, Florida, Iowa, and Porto Rico; the leafspot only from Massachusetts, and Tidewater Virginia; and the fruit rot only from New Jersey, Kansas, and Arizona. Losses reported were 15 per cent in Georgia, 5 per cent in Maryland, 2 per cent in Arizona, and a trace in Iowa.

New Jersey: Dusting with copper-lime after fruit rot started failed to check the disease. (Haenseler).

Georgia (southern): General in Coastal Plain, very important in some fields especially under irrigation. Most severe in low fields near creeks, and under irrigation. No disease until after drought broke in June. (Boyd)

Florida: Infection by this fungus has been found in 100 per cent of the fields, in a majority of them being from 90 to 100 per cent. This is the worst disease of eggplants in the state, not only causing considerable damage to the foliage, but also affecting a large percentage of the fruit and causing losses both in the field and in transit. (Weber)

OTHER DISEASES

Verticillium alboatrum Reinke & Berth., wilt. Chupp reported from New York, "In many parts of the state very few eggplants are found, because of this disease. It is very common on the Black Beauty variety, and is most serious in Monroe and Schenectady Counties. In Niagara County the Florida High, which seems resistant, is grown." In New Jersey, according to Haenseler, "Heavy green manures plus sulfur to acidify the soil gave a partial control." The disease was reported also from Virginia and Ohio.

Bacterium solanacearum EFS., bacterial wilt, was reported from South Carolina, Florida, and Porto Rico. Weber stated that in Florida, "This wilt was found in practically all eggplant fields visited. The loss amounts to 2 per cent. The plants are usually killed before any marketable fruit develops."

Mosaic (undet.) was reported from Florida and Indiana, and McWhorter reported a "mosaic-like chlorosis" from Virginia. In Indiana, "The disease was noted on a few plants in a rather large plot near badly infected tomatoes," according to Gardner. Weber reported that in Florida mosaic was found on a about 70 per cent of the wild eggplant (*Solanum floridanum*) growing in waste places, but it was not important on the cultivated plant.

Elmer (1) found that mosaic could be transmitted from eggplant to cowpea.

Alternaria solani (Ell. & Mart.) Jones & Grout, early blight, New York, Florida.

Corticium vagum Berk. & Curt., damping-off, Connecticut, Virginia.

Phyllosticta hortorum Speg., leafspot, Florida.

Wilt (undet.). Serious locally in Indiana. (Gardner)

Recent literature:

1. Elmer, O. H. Transmissibility and pathological effects of the mosaic disease. Iowa Agr. Exp. Sta. Res. Bul. 82: 39-91. 1925.

2. Ocfemia, G. O. The Phytophthora disease of eggplant in the Philippine Islands. Philipp. Agr. 14: 317-328. Nov. 1925. Caused by *Phytophthora melongenae* Sawada; known in the Philippines since 1918. At times has caused considerable damage to the fruits. Has been reported only from Japan and the Philippines.

ENDIVE

Softrot caused by Bacillus carotovorus Jones, serious in several cases in eastern Massachusetts. (Osmun & Davis)

Crown rot caused by Botrytis sp., was very common in storage and caused much loss, as much as 20 to 30 per cent, in New York. (Chupp)

Rot caused by Sclerotinia spp. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

GANDULE (PIGEON PEA)

The following diseases were reported from Porto Rico:

Leafspots caused by *Cercospora instabilis* Rangel, *Phyllosticta* sp., and *Vellosiella cajani* Rangel.

Anthracnose caused by *Colletotrichum cajani* Rangel.

Rust caused by *Uromyces dolicholi* Arth., common.

Damping-off caused by *Rhizoctonia ferruginea* Matz.

Collar rot, and *galls*, undet.

GINSENG

Blight caused by Alternaria panax Whetzel was reported from Michigan, "One large grower sent in one-year old roots with well-developed lesions at the crown and reported many thousand similarly affected" (Nelson), and West Virginia.

Rootrot caused by Armillaria mellea (Vahl) Quel., Washington.

Rot caused by Phytophthora sp., Washington.

HOP

Downy mildew caused by Pseudoperonospora humuli (Miyabe & Takah.) Wils. Salmon and Ware (2-5) report that this disease is becoming of considerable economic importance to hop growers in England. It was at first thought to have been introduced from either the United States or Japan, but it is now believed to be native to England.

Powdery mildew caused by Sphaerotheca humuli (DC.) Burr., New York.

Recent literature on hop diseases:

1. Korff. Dem Hopfenbau drohende Gefahren. Prakt. Blätter Pflanzenbau und Pflanzenschutz 3: 56-58. 1925.
2. Salmon, E. S., and W. M. Ware. The downy mildew of the hop. Jour. Min. Agr. Great Britain 31: 1144-1151. March 1925.
3. --------------------- The downy mildew of the hop and its epidemic occurrence in 1924. Ann. Appl. Biol. 12: 121-151. May 1925.
4. --------------------- On the presence of a perennial mycelium in Pseudoperonospora humuli (Miyabe & Takah.) Wils. Nature 116: 134-135. 1925.
5. --------------------- New facts concerning the downy mildew or 'spike disease' of the hop. Jour. Kent Farmers' Union 18: 21-22. 1925.
6. --------------------- Virus diseases and the grafting of the hop. Gard. Chron. III, 77: 320-322. May 9, 1925.
   Nettle-head and mosaic.
7. Salmon, E. S., and H. Wormald. Diseases of the hop crop. (ex 'Cultivation, diseases, and insect pests of the hop crop'). Min. Agr. Misc. Publ. 42: 41-58. 1925.

MANGEL

Leafspot caused by Cercospora beticola Sacc. caused serious damage in Dutchess County, New York (Chupp); also reported from Louisiana.

Downy mildew caused by Peronospora schachtii Fckl. Salmon, E. S., and W. M. Ware. Downy mildew of mangold and beet. Jour. Min. Agr. Great Britain 32: 833-838. Dec. 1925. First reported occurrence in Great Britain in 1921 on sugar beet. Outbreak in 1925 on mangold. Sugar beet culture is becoming of increasing importance in Great Britain and the disease should not be allowed to become established, since it is capable of causing serious damage.

Rhizoctonia sp., Washington.

Bacterial soft rot, Washington.

OKRA

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) caused losses estimated at 5 per cent in southern Georgia and one-half per cent in Texas, and was said to be locally severe in South Carolina and Arizona.

Wilt caused by Fusarium vasinfectum Atk. Delaware (first observation, Adams), southern Georgia (General in Coastal Plain - Boyd), Texas.

Leafspot caused by Cercospora hibisci Tr. & Earle, Porto Rico.

Rootrot caused by Ozonium omnivorum Shear, prevalent in the black lands of Texas, loss 1 per cent (Taubenhaus).

Rootrot caused by Rhizoctonia sp., Texas.

PARSLEY

Drop caused by Sclerotinia sclerotiorum (Lib.) Mass. "Truckers in Tidewater Virginia have reported considerable loss from this disease." (McWhorter)

Late blight caused by Septoria petroselini Desm., New Jersey.

PARSNIP

Leaf blight caused by Cercospora apii pastinacae Farl. was reported from Connecticut, New Jersey, and Indiana.

Leafspot caused by Cercosporella pastinacae Karst., common in New York, loss trace to 2 per cent. (Chupp).

Leafspot caused by Ramularia pastinacae (Karst.) Lindr. & Vester. New York, Indiana (serious locally - Gardner).

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb), Kansas "Total loss in field reported. Peaches on the same land in 1924 were killed." (White)

Rot caused by Sclerotinia spp. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

PEANUT

Leafspot caused by Cercospora personata (Berk. & Curt.) Ell. & Ev. was apparently less important than usual. It was reported from southern Georgia, Florida, Louisiana, and Porto Rico. Boyd reported a loss of one per cent in Georgia and stated that its failure to develop as usual was due probably to the generally dry weather.

Rootrot caused by Ozonium omnivorum Shear, prevalent in the black lands of Texas (Taubenhaus).

Rust caused by Uredo arachidis Lagh., Porto Rico.

Chlorosis due to excess of lime, Texas.

Rosette (undet.). Storey, H. H., and A. M. Bottomley. Transmission of a rosette disease of the ground nut. Nature. 116: 97-98. 1925. Virus disease; has caused considerable loss in South Africa.

PEPPER

Black spot caused by Alternaria sp. or Macrosporium sp. was reported from New York, New Jersey, eastern Virginia (accompanying Colletotrichum - McWhorter), Florida (Macrosporium commune Rab. - Weber), Missouri, and New Mexico (loss 4 per cent - Crawford).

Bacterial wilt caused by Bacterium solanacearum EFS. was reported from Texas and Porto Rico.

Bacterial spot caused by Bacterium vesicatorium Doidge was rather widely distributed in Florida but not especially important except on fall plantings in Manatee County, where it caused considerable defoliation and fruit spotting. (Weber).

Leaf blotch caused by Cercospora capsici Heald & Wolf was said by Weber to be the most common and most severe disease of the host in Florida, occurring throughout the state and in many localities causing serious losses through defoliation. It was also reported from Texas and Porto Rico.

Soft rot caused by Choanephora cucurbitarum (Berk. & Rav.) Thax. was reported from Florida.

Damping-off caused by Corticium vagum Berk. & Curt. Connecticut, "Mostly on flats in greenhouses or hotbeds in early part of the season. Peppers seem to suffer most." (Clinton & Wilkinson)

Fruit rot caused by Corticium vagum Berk. & Curt. Florida, on fruits touching the ground, not common. (Weber)

Fruit rot caused by Fusarium sp., common in Florida. (Weber)

Wilt caused by Fusarium sp. was reported from eastern Virginia (probably Fusarium, not investigated; occurred where peppers followed tomatoes - McWhorter), Arizona (loss 3 per cent - Streets), and Porto Rico.

Wilt caused by Fusarium annuum Leonian was very destructive to Chile peppers in New Mexico, causing a loss estimated by Crawford at 20 per cent. Crawford stated that a 12-day irrigation schedule reduces the amount of wilt.

Anthracnose caused by Glomerella piperata (Ell. & Ev.) Spauld. & Schrenk (Colletotrichum nigrum Ell. & Halst.; Gloeosporium piperatum Ell. & Ev.) was reported from eastern Virginia, Florida, Kansas, and Porto Rico. McWhorter stated that Colletotrichum nigrum is the most common rot of peppers in Tidewater Virginia.

Bertus, L. S. A fruit rot of chillies. Yearbk. Dept. Agr. Ceylon 1925: 47-50. 1925.

Rootknot caused by Heterodera radicicola (Greef) Muell. (Caconema radicicola (Greef) Cobb) was reported from southern Georgia, Florida, and New Mexico. Boyd reported from Georgia, "Rootknot was of slight importance, occurring mostly in home gardens, and especially on the fall crop half grown. The loss is estimated at 2 per cent." Crawford estimated a loss of 8 per cent to Chile peppers in New Mexico.

Rootrot caused by Ozonium omnivorum Shear, Texas.

Rootrot caused by Pythium sp., Porto Rico.

Watery soft rot caused by Sclerotinia sclerotiorum (Lib.) Mass. Fruit rot occurred sparingly on the fall crop in western Florida. During the early spring the disease caused serious rotting of the stems, leaves, and fruits on the lower east coast. (Weber)

Blight caused by Sclerotium rolfsii Sacc. Weber reported from Florida, "Most of the trouble during the fall has been along the west coast on the fruits. Whenever they come in contact with the soil they are attacked by the fungus, which causes a rapid rot. Stem girdling has also been common over the state in general." The disease was reported also from Georgia, where Boyd estimated a loss of one per cent, and from Porto Rico.

Fruit rots caused by *Botrytis* sp., *Rhizopus* sp., and *Cladosporium* sp. were reported from Washington.

Mosaic (undet.) was reported from New Jersey, Florida, Ohio, Indiana, Kansas, and New Mexico. Gardner stated that it was serious in market gardens in Indiana; otherwise, although said to be common in some cases, it was not important.

Blossom-end rot (non-par.). Higgins, B. B. Blossom-end rot of pepper (*Capsicum annuum* L.). Phytopath. 15: 223-229. 1925.

Damping-off (undet.), New York.

RHUBARB

CROWN ROT CAUSED BY PHYTOPHTHORA SPP.

Crown rot caused by *Phytophthora* sp. was reported from Kansas. White stated that "In a planting at Wichita, 8 plants were left out of 50 set. The disease corresponds to Beach's description of crown rot. Isolations yielded *Phytophthora* sp."

Crown rot caused by *Phytophthora cactorum* (Leb. & Cohn) Schroet. Beach (1) reports that copper-lime dust may be used to control this crown rot, also that early setting helps to prevent it.

Foot rot caused by *Phytophthora parasitica rhei* Godf. was reported by Tims to be severe in a small area at Baton Rouge, Louisiana. It has not been reported from Louisiana previously.

Leonian (2) includes *P. parasitica rhei* in *P. omnivora* D By.

Recent literature:

1. Beach, W. S. Crown rot of rhubarb. In Pennsylvania Agr. Exp. Sta. Bul. 196 (Ann. Rept. Director 38, 1923/24): 16. July 1925.

2. Leonian, Leon H. Physiological studies on the genus Phytophthora. West Virginia Agr. Exp. Sta. Sci. Paper 11. Reprinted from Amer. Jour. Bot. 12: 444-498. July 1925.

OTHER DISEASES

Leafspot caused by *Ascochyta rhei* Ell. & Ev. was reported from Connecticut, New York, and New Jersey.

Gray mold rot caused by *Botrytis* sp. Michigan "Very troublesome in forcing houses. Often very destructive where sanitation and ventilation do not receive proper consideration." (Nelson)

Downy mildew caused by *Peronospora jaapiana* Magn. Birmingham, W. A. "Downy mildew" of rhubarb. Peronospora jaapiana, Magn. Agr. Gaz. New South Wales 36: 288-290. 1925.

Leafspot caused by *Phyllosticta straminella* Bres. New York.

ROSELLE

Powdery mildew caused by Microsphaera euphorbiae (Pk.) Berk. & Curt., Florida.

Root disease caused by Rhizoctonia sp., Porto Rico.

SALSIFY

White rust caused by Albugo tragopogonis (DC.) S. F. Gray, New York, Michigan, Washington.

Rot caused by Sclerotinia spp. Ramsey, G. B. Sclerotinia species causing decay of vegetables under transit and market conditions. Jour. Agr. Res. 31: 597-632. Oct. 1, 1925.

SCHAFF (RUMEX ACETOSA)

Leafspot caused by Gloeosporium rumicis Ell. & Ev. "Found on Long Island, New York, where the host (called schaff) is grown for greens." (Chupp)

Mosaic (undet.). New York, probably statewide. (Chupp)

SISAL

Anthracnose caused by Colletotrichum agaves Cav., Porto Rico.

SPINACH

DOWNY MILDEW CAUSED BY PERONOSPORA EFFUSA (GREV.) CES.

Downy mildew was evidently more important than usual. It was reported to be destructive in Connecticut, Virginia, South Carolina, Louisiana, Texas, New Mexico, and Manitoba, and in some other states was serious locally in some plantings. The reports from Delaware, Louisiana, and Manitoba stated that the disease had not been observed previously in those sections. New York, New Jersey, Kansas, and Washington also reported its occurrence.

Losses reported as due to downy mildew were 10 per cent in Connecticut, 8 per cent in Texas, 7 per cent in New Mexico, about 3 to 5 per cent in South Carolina, and a trace in Kansas.

Following are quotations from some of the reports from collaborators.

> Connecticut: More than usual, about same as last year. Attacks all varieties; winter stage carried over in soil by lambs' quarters. Glut in market made loss from this disease less serious than it otherwise would have been. (Clinton)

New York: Fairly common on older spinach; statewide. (Chupp)

Virginia: Downy mildew was extremely severe in the entire Norfolk region during late November. This disease, according to Mr. Zimmerley, who has had a most excellent opportunity to observe it year by year, is at present more severe than at any time in the past 9 years. We have had a short spell of warm days, followed by cold rainy weather. Our observations agree that the disease has developed with remarkable rapidity during the short rainy spell. We are getting a number of trouble calls now from growers. We have never considered spraying spinach after it reaches a certain size as feasible, but may be forced to try some control work this year. It has been our custom to pay little attention to spinach mildew, reckoning it as a minor trouble. (McWhorter, Nov. 20)

South Carolina: The only disease of importance down here at present is the mildew of spinach. This trouble made its appearance the latter part of November and was present in all fields by December 15. Infections as high as 100 per cent were noted the last week of December. The cutting season is now on and the total losses will not run higher than from 3 to 5 per cent. (Moore, Jan. 25, 1926).

Louisiana: This disease was found for probably the first time in the state, in Iberville and East Baton Rouge Parishes. It evidently caused some damage in several places over the state. (Edgerton & Tims, Feb. 26)

Michigan: Reported from Harbor Springs as common and destructive in July. (Nelson)

OTHER DISEASES

Anthracnose caused by *Colletotrichum spinaciae* Ell. & Halst. was reported from Texas.

Wilt caused by *Fusarium* sp. Texas, important in restricted localities. (Taubenhaus)

Leafspot caused by *Heterosporium variabile* Cke. was reported by McWhorter from Virginia.

Rust caused by *Puccinia sarcobati* (Pk.) Bethel, Washington.

Rootrot caused by *Pythium debaryanum* Hesse. Connecticut "On base of old plants and therefore unusual as it commonly causes damping-off of young seedlings." (Clinton)

"Blight, cause unknown (*Fusarium* sp.?, beet curly top?) was worse than usual and worse than last year in California, in the San Francisco Bay and Sacramento River districts. It destroyed some late spring plantings and the early fall crop and also reduced the yield of the seed crop. The loss is estimated at 10 per cent. It causes yellowing and collapse of the leaves and decay of the tap root." (Rosa)

Chlorosis (non-par.). McLean, Forman T., and Basil E. Gilbert. Manganese as a cure for a chlorosis of spinach. Science n. s. 61: 636-637. 1925. Dilute solution of manganous sulfate applied as a spray.

"Wilt (undet., bacterial ?), seriously affected the seed crop in making blight resistant seed. This disease is now being investigated at the Virginia Truck Experiment Station." (McWhorter)

SPINACH (NEW ZEALAND)

Mosaic (undet.). "Typical symptoms observed on plants in greenhouse, Newark, Delaware." (Adams).

SWISS CHARD

Leafspot caused by Cercospora beticola Sacc. was reported from Texas and Porto Rico.

YAM

Leafspot caused by Cercospora carbonacea Miles was reported from Porto Rico.